Canada. National Energy
Board
Proposed approach to incentive rate of return for the
Northern Pipeline

CANADA

NATIONAL ENERGY BOARD

PROPOSED APPROACH TO INCENTIVE RATE OF RETURN FOR THE NORTHERN PIPELINE

OCTOBER 1978

NATIONAL ENERGY BOARD

PROPOSED APPROACH TO INCENTIVE RATE OF RETURN
FOR THE NORTHERN PIPELINE

The enclosed volume contains three documents:

(1) National Energy Board, Proposed Approach to Incentive Rate of Return (IROR) for the Northern Pipeline and Regulations to Implement it, PRELIMINARY DRAFT.

(2) Northern Pipeline Act, Regulations made Pursuant to Section 36 of the Northern Pipeline Act on the Incentive Rate of Return (IROR) and related Tariff Matters, DRAFT.

(3) United States of America, Federal Energy Regulatory Commission, Incentive Rate of Return for the Alaska Natural Gas Transportation System, Docket No. RM 78-12.

This material sets forth Canada's proposed approach to an incentive rate of return scheme and the regulations to implement it. Prior to implementation of this proposal, the Board invites the comments of interested parties on this material. Should you intend to comment, please observe the procedures and deadlines set out on Pages 11 and 12 of the first document.

Brian H. Whittle,
Secretary.

Ce volume est publié séparément dans les deux langues officielles

October 5, 1978

NATIONAL ENERGY BOARD

PROPOSED APPROACH TO INCENTIVE RATE OF RETURN (IROR) FOR THE NORTHERN PIPELINE AND REGULATIONS TO IMPLEMENT IT

PRELIMINARY DRAFT

PRELIMINARY DRAFT

I. Introduction

The traditional tool for cost control in pipeline construction has been regulatory review of expenditures after the project has been completed. This review has taken place in rate proceedings with the risk to investors that imprudently incurred expenditures would be disallowed and therefore would not be recoverable in the rates charged for the transportation service.

This approach, by itself, is not adequate in the special circumstances pertaining to the Northern Pipeline. Therefore, the United States and Canadian Governments agreed that there should be an economic incentive scheme to control costs to the lowest level consistent with design specifications and sound engineering and operating practices. This is the purpose of the proposal for an Incentive Rate of Return on the equity invested in the pipeline.

This preliminary draft with attachments, outlines the Canadian and United States approach to an Incentive Rate of Return Scheme, makes proposals for the Canadian portion of the pipeline, suggests the contents of the regulations to implement the scheme, and outlines the regulatory procedures for reviewing the preliminary draft prior to the promulgation of the regulations.

The rates of return shown in this document are tentative pending the receipt of submissions from interested parties and clarification of various matters which affect the assessment of risk relative to different segments of the pipeline.

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II. Proposed Approach to Incentive Rate of Return (IROR)

1. Canada-U.S. Agreement

The requirement that an incentive rate of return scheme for the purpose of controlling construction costs should be applied to the companies owning the Pipeline in each country was an essential component of the Canada-U.S. Agreement on a northern natural gas pipeline.

This requirement is incorporated in the agreement as follows:

> 4 (*b*) The two Governments recognize the importance of constructing the Pipeline in a timely way and under effective cost controls. Therefore, the return on the equity investment in the Pipeline will be based on a variable rate of return for each company owning a segment of the Pipeline, designed to provide incentives to avoid cost overruns and to minimize costs consistent with sound pipeline management. The base for the incentive program used for establishing the appropriate rate of return will be the capital costs used in measuring cost overruns as set forth in Annex III.

and

> 4(c). . . . ; nor will the variable rate of return provisions referred to in subparagraph (b) be continued to the detriment of financing the Dempster Line.

Northern Pipeline Act
S.C. 1977-78
c.20
Schedule 1.

2. The Northern Pipeline Legislation

The Northern Pipeline legislation provided the means in Canada for implementing the Agreement.

> 3. The objects of this Act are
> (a) to carry out and give effect to the Agreement;

Northern Pipeline Act
S.C. 1977-78
c. 20

and recognized the need for compatibility between the Incentive Rate of Return Scheme and the financability of the pipeline.

Tolls and Tariffs

> 33. The Board shall, in fixing the tolls and tariffs of a company, apply the requirements of the Agreement, in particular the requirements of paragraphs 4, 5, 6, 11 and 12 thereof, and . . .

34. The Board shall, in determining an appropriate rate of return on equity investment in a company,

(*a*) take into account

(i) the capital cost estimates set out in the Agreement, and

(ii) the extent to which variations in actual costs from the estimates referred to in subparagraph (i) were within or outside the control of the company;

(*b*) establish a rate of return, taking into account the factors set out in paragraph (*a*), that is not detrimental, when taken into account with the rate of return of every other company, to the financing of the Dempster Line described in the Agreement; and

(*c*) comply with such regulations as the Governor in Council may make prescribing or otherwise relating to the manner of calculation of the rate of return.

35. Where a company files a tariff at the time the financing of the pipeline is being considered, the Board may approve the form and content of the tariff and the rate of return on the equity investment of the company.

<u>Northern Pipeline Act</u>
S.C. 1977-78
c. 20
Part II - Traffic, Tolls and Tariffs

3. <u>The Purpose of the Incentive Rate of Return Scheme</u>

The purpose of the Incentive Rate of Return Scheme may be described as follows:

- **to provide just and reasonable**
  compensation for investors, in order that

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sufficient capital may be attracted to finance the project;

- to provide incentives to promote good cost control performance, so that cost overruns will be less extensive than they might have been without IROR;
- to provide transportation service at a lower unit cost than (and not higher than) would have been the case in the absence of IROR.

In summary, the IROR should cause savings in construction costs; such savings will be divided between lower costs to consumers and higher returns to investors as a reward for cost control. Thus, the ultimate effect of applying IROR to hold down costs will be to provide lower cost gas to consumers.

4. <u>Relationship to Financing of the Pipeline</u>

It has always been recognized that the private financing of a pipeline through the United States and Canada, costing over $10 billion, will be a complex and difficult task. Therefore, investors will need to know with reasonable precision before committing funds, what the rewards to equity investors will be and what the interest coverage and other security features of debt instruments will be.

As already indicated, the Northern Pipeline Act makes provision for the specification of a rate of return at the time the pipeline financing is being considered. This preliminary draft is therefore a first step in the regulatory proceedings necessary to ensure that regulations can be issued specifying the rate of return at that time.

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The passage of the U.S. Energy Bill establishing the essential pricing base for the sale and transportation of Alaskan gas is now nearing completion. Therefore, the contractual base for Alaskan gas can be expected to be clarified shortly and, consequently, financing planning and negotiations will gain momentum. It is therefore necessary at this time to start to clarify the Canadian position on the IROR Scheme - an essential parameter of any financing plan.

5. Relationship to the United States Approach to the Incentive Rate of Return

The Federal Energy Regulatory Commission (FERC) and the National Energy Board have had, and continue to have, joint consultations on the proposed Incentive Rate of Return Scheme. The Canada-U.S. Agreement provided for these consultations.

Rulemaking proceedings initiated by the FERC have been in progress for some time and the Commission stated its position on this subject in a document issued on the 15th of September, 1978 which is attached as Annex I. This calls for further comments from interested parties by October 6, 1978.

6. Need for Uniformity with the United States Scheme

The fact that the pipeline is a single entity for both financing purposes and to a large extent, for transmission and tariff purposes, suggest that as far as practical there should be a relatively uniform approach in both Canada and in the United States.

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Uniformity would ensure that the capital attraction tests would be similar in both countries, and also that the regulatory methods used in the determination of the rewards to capital would be comparable and consequently more easily understood by investors in the Canadian and U.S. portions of the line. Likewise, for the shippers on the system, uniformity of treatment in each country would simplify administrative arrangements.

Therefore, except where there are specific reasons to differ, as noted in 7. below, it would be practical for the United States and Canada to adopt similar approaches and use similar concepts and terminology.

7. Reasons for Certain Differences in the Canadian Approach

There are some essential differences between the situation in Canada and that prevailing in the United States.

In the first place, interest rates and returns on equity for pipeline companies have traditionally been somewhat higher in Canada compared with the United States. In addition, there is an investment tax credit available to U.S. pipeline companies with no such tax credit available in Canada.

A second difference, this one resulting from a uniquely Canadian situation, arises from the incentive in the Canada-U.S. Agreement to build the main line system in Canada for less than 135 per cent of "filed capital costs", which could result in Canadian shippers of Delta gas paying no tariff on the Dawson-Whitehorse segment of a potential Dempster link. This provides a powerful incentive for Canada to construct the main Alaska Highway line under effective

cost controls in order to obtain the lowest cost tariff for Delta gas shipped to Canadian markets. For this reason, the Canadian incentive scheme will be based on the features contained in the Canada-U.S. Agreement.

Thirdly, the "filed capital costs" in that Agreement, as amended, which relate solely to the pipeline in Canada, are based on the expected prices and inflationary impacts forecast at the time of the National Energy Board Hearings. It is these "filed capital costs" with which the actual costs of construction will be compared by the Board. The United States, on the other hand, appears in its IROR scheme, as set forth in the attachment, to be planning to deflate actual costs of construction to, say, 1978 dollars, and to compare them with the estimates available at the time of the Canada-U.S. negotiations, also priced in 1978 dollars. (Some changes in scope of the project may also be permitted).

8. Insights into United States Views on the Incentive Rate of Return

The Federal Energy Regulatory Commission's rulemaking document (Annex I) delves at considerable depth into the underlying concepts used in the Incentive Rate of Return Scheme. Because of the availability of the FERC document, this Canadian preliminary draft can be more concise in content.

9. Purpose of the Preliminary Draft

The purpose of the preliminary draft is to place before the pipeline companies and other interested parties Canada's proposed approach to an Incentive Rate of Return Scheme, the rates of return to be used, other parameters considered, and the regulations necessary to implement this scheme.

The Minister responsible for the Northern Pipeline Act, and the National Energy Board, are seeking the views of interested parties so that modifications may be incorporated before the regulations are promulgated. The regulations will need to be issued, as indicated earlier, before any definitive financing scheme can come into existence.

10. Procedures to be Followed in Promulgating Regulations

This preliminary draft is being sent to companies building the pipeline in Canada, Attorneys General of the Provinces, the companies in the United States constructing the pipeline, the Canadian Petroleum Association, the Independent Petroleum Association of Canada, the Canadian Gas Association, known United States shippers and intervenors in the Board's Northern Pipeline Hearing. The NEB will, by press release, make known the existence of the preliminary draft and will make copies available on request.

The Board requests that the companies building the pipeline in Canada submit written comments with supporting data concerning the matters set forth in this preliminary draft. An original and 20 copies should be filed with the Secretary of the Board, 473 Albert Street, Ottawa, Canada K1A OE5 by Monday, 6 November 1978. If interested parties wish to receive copies of the submissions of the companies building the pipeline, they should notify the Secretary of the Board in writing by Monday, 30 October 1978. The Board will send the companies building the pipeline a list of the names and addresses of such interested parties and will require the companies

building the pipeline to serve a copy of their submissions on these parties by Monday, 6 November 1978.

The Board invites interested persons to submit written comments with supporting data concerning the matters set forth in this preliminary draft. An original and 20 copies should be filed with the Secretary of the Board, 473 Albert Street, Ottawa, Canada K1A OE5, by Monday, 20 November 1978, and a copy should be served on Foothills Pipelines (Yukon) Ltd., 1600 Bow Valley Square II, 205 - 5th Avenue S.W., Box 9083, Calgary, Alberta T2P 2W4.

All written submissions will be available for public inspection at the National Energy Board Library, Room 962, during regular business hours.

The companies building the pipeline may make a further submission to the Board in the manner previously indicated, by Monday, 4 December 1978 and should serve a copy on all interested parties contained in the list provided by the Board, by the same date.

Following consideration of these submissions by the Board and the Minister responsible for the Northern Pipeline, regulations will be submitted to the Governor in Council for approval.

These regulations will be subject to review at the time the tariff is being approved and the financing plan is being considered. This may be through the public hearing process.

III. Proposal

A. Description of Terms Used

An understanding of the IROR Scheme requires the use of terms not usually forming part of the terminology used in traditional pipeline regulation. These terms are therefore set forth.

1. Benchmark Rates of Return and Risk Premiums

As a starting point for setting the IROR schedule, certain rates of return can be used as benchmarks. These benchmark rates of return are specifically linked to the various types of unusual risk facing this project.

(a) Operation Phase Rate: This is the rate of return to be allowed on the adjusted* rate base. It is a starting point for determining the actual incentive rate that will be allowed, and will exclude consideration of the special construction and completion risks of the Northern Pipeline. This rate should be the same as the rate allowed on pipelines of similar operating risk.

(b) Non-incentive Rate: This rate is arrived at after evaluating the special risks inherent in the Northern Pipeline project. It equals the sum of the Operation Phase Rate and a Project Risk Premium for those construction and completion risks unique to the Northern Pipeline project. This rate would be granted under conventional regulatory practices in the absence of the IROR.

(c) Centre Rate: The Centre Rate includes compensation for all risks associated with the project. Specifically, it is the sum of the Operation Phase Rate, the Project Risk Premium, and the IROR Risk Premium. (The Centre Rate is equivalent to the Non-incentive Rate plus the IROR Risk Premium). The IROR Risk Premium is to compensate investors for the risk introduced by the variability in the allowed rate of

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*See pages 20, 21 and 22

return implied by the adoption of IROR. The Centre Rate will be earned if actual project costs equal the expected level of cost overruns.

In establishing these benchmark rates of return, the primary consideration will be to determine the just compensation for bearing the risks of this project. These risks are affected by (among other factors):

- The cost-of-service tariff to be granted for this project.
- The beneficial effect on marketability of Alaskan gas of rolling in its costs.
- The unusual construction and non-completion risks faced by this pipeline.
- The financing plan of the project sponsors.
- The variability in allowed rate of return imposed by the IROR.
- The degree of flexibility allowed in adjusting estimated costs.

While the overall objective within Canada is to contain costs within 1.35 times "filed capital costs" in order to benefit from the incentive contained in the Canada-U.S. Agreement, the expected level of cost overruns (i.e., the Centre Point) for different zones* of the pipeline, at which the Centre Rate will be earned, will relate more to the construction terrain and weather conditions in each zone.

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* The Zones are identified on page 26

2. <u>Cost Performance Ratio</u>

The Cost Performance Ratio is an index of the degrees of cost overruns or underruns. It is simply the ratio of actual construction costs to "filed capital costs" in the Canada-U.S. Agreement including any adjustments for timing changes and other matters as provided for in the Agreement.

The actual construction costs for the purpose of calculating this ratio will include an allowance for funds used during construction (AFUDC) as well as all monitoring costs, including an estimate approved by the Board of monitoring costs expected to be incurred in the year subsequent to "leave to open" being granted. However, they will not include working capital, the provision for road maintenance in the Yukon Territory (not to exceed $30 million Canadian), or property taxes which are also excluded from the "filed capital costs" as identified in the Canada-U.S. Agreement.

In addition, the actual construction costs will exclude, as set forth in Annex III of the Canada-U.S. Agreement:

> ". . . the effect of increases in cost or delays caused by actions attributable to the U.S. shippers, related U.S. pipeline companies, Alaskan producers, the Prudhoe Bay deliverability or gas conditioning plant construction and the United States or State Governments. If the appropriate regulatory bodies of the two countries are unable to agree upon the amount of such costs to be excluded, the determination shall be made in accordance with the procedures set forth in Article IX of the Transmit Pipeline Treaty."

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The "filed capital costs" in the Canada-U.S. Agreement do not include monitoring costs, but as a result of an exchange of notes by the two governments shall be deemed to include them. Both actual construction costs and "filed capital costs" for the purpose of calculating the Cost Performance Ratio will exclude working capital.

The IROR schedule will relate a rate of return to each Cost Performance Ratio. As the ratio increases, signifying overruns, the associated rate of return decreases.

3. The Marginal Rate of Return

(a) The concept of the Marginal Rate

The schedule relating increased cost to the allowed rate of return on equity established by the Board (the IROR schedule) will imply or define the marginal rate of return. The Board must consider the marginal rate in order to determine the cost control incentive created by the schedule. Similarly, equity investors or project sponsors must consider the implicit marginal rate in order to determine the rewards available to them for holding down cost overruns. The relationship of the marginal rate to the investors' cost of capital determines the amount of effort that is justified to avoid cost overruns.

The marginal return is the return on the incremental dollars invested to move from one cost performance ratio to another. For illustration, the following example is used:

Cost Ratio	Allowed ROR
1.2	17.8%
1.3	17.0%
1.4	16.4%

Assume that a ratio of 1.3 has already been reached and in order to complete the project more funds must be invested and a ratio of 1.4 is attained. If the project had been completed at 1.3 (30% overrun), the allowed ROR would have been 17.0%. However, since the project will be completed at 1.4 (40% overrun), the allowed ROR on all equity will decrease to 16.4%.

Given these rates of return, it follows that the actual return earned on the additional dollars invested to move from 1.3 to 1.4 (regarded as 1.3 and 1.4 million dollars: the incremental investment is then 0.1 million dollars) is 8 per cent. This results from the following calculation.

$$\frac{(\text{earnings at } 1.4) - (\text{earnings at } 1.3)}{\text{increase in rate base}}$$

$$= \frac{(1.4)(.1636) - (1.3)(.17)}{1.4 - 1.3}$$

$$= .08 = 8\% \text{ marginal return.}$$

(b) The Importance of the Marginal Rate

A profit maximizing investor seeks to invest his funds so as to earn a rate of return that is higher than his cost of capital. If capital costs more than an investment earns, then the investment is unattractive.

Investors also exhibit marginal behavior. That is, profits will be maximized only when each unit of capital invested is itself as profitable as possible.

Under IROR, an investor faced with the prospect of financing cost overruns will examine the return on his investment of the additional unit of capital necessary to pay for the overrun. If he finds that return to be lower than his cost of capital, he will strive to avoid the investment.

The essential point about the marginal rate is that it must be set below investors' cost of capital if the IROR is to offer rewards for reducing overruns. If the marginal rate were above the cost of capital, then investors could earn more by investing in overruns than they could in alternative investments. In that case, investors would be made worse off by avoiding overruns, and the IROR would have failed its primary purpose. If the marginal rate were below the cost of capital, however, investment in overruns would be unattractive.

The marginal rate, and thus the degree of incentive, can be set independently of the Centre Rate. An IROR

schedule can maintain the same incentive to control costs, even though the overall level of compensation in the schedule might be moved up or down.

Since the calculation of the Cost Performance Ratio includes the AFUDC, a low marginal rate also provides incentives for avoiding construction delays. If construction is delayed, the AFUDC account grows. This raises the actual cost of construction and the Cost Performance Ratio, with a corresponding decline in the allowed rate of return. Thus, holding to the construction schedule will avoid penalties in much the same way as does reducing cost overruns.

(4) The Centre Point

One of the Cost Performance Ratios must be chosen as the starting point for constructing the IROR schedule. Once that point has been assigned a rate of return, and the marginal rate has been chosen, the entire schedule can be determined.

The Centre Point is that Cost Performance Ratio which is associated with the Centre Rate of Return. Ratios above the Centre Point will be considered as overruns, yielding rates of return below the Centre Rate. Ratios below the Centre Point will be considered as underruns and will be rewarded with returns higher than the Centre Rate. However, because of the implications in the financing of the Dempster Highway project, the Incentive Rate of Return will never be below the level of the Operating Phase Rate.

In order for the Centre Rate to be perceived by investors as adequate compensation for risk, it should be the rate of return that they would expect to receive. As a result, the Centre Point should be set at the most likely Cost Performance Ratio. Then, if the final costs are at the expected levels, the Centre Rate will be earned.

B. Allowance for Funds Used During Construction

In the National Energy Board's Gas Pipe Line Uniform Accounting Regulations, the term "Interest During Construction" (IDC) is used to reflect the financing costs applicable to the funds used for construction purposes. This term is used whether the funds include an equity component or not.

The more common terminology in North America is "Allowance for Funds Used During Construction" (AFUDC). Since AFUDC is used in the FERC rulemaking document, it will be used in this preliminary draft. AFUDC and IDC should be assumed to be identical terms. The return on common equity used in AFUDC will be the non-incentive rate applied to the amount of common equity invested and the cost of debt and any preferred stock will be the actual cost as determined by the Board.

C. One-time Adjustment to the Rate Base

The proposed IROR Scheme is based on applying the Operation Phase Rate during the operating phase, but providing a one-time adjustment to rate base when operations start, equivalent to the difference between return

on equity expressed in dollars using the incentive rate, and that using the Operation Phase Rate over the operating life of the pipeline. This means that the present value of the revenues to the equity holders provided by application of the Operation Phase Rate to the adjusted rate base would equal the present value of the revenues to the equity holders provided by application of the Incentive Rate of Return to the actual rate base.

The procedure for determining the one-time adjustment is: (1) project the common equity component of actual construction costs including AFUDC for each operating year by reducing it to zero over a 25-year period (to reflect depreciation recovery); (2) apply the difference between the Incentive Rate of Return and the Operation Phase Rate to the dollar value of the common equity component in each year; (3) calculate the present value of this stream of income, using the Operation Phase Rate as the discount rate; and (4) add the present value determined in (3) to the rate base.

This one-time adjustment procedure does not change the present value of the project's revenue stream, as compared to the incentive rate of return. Because of this, the one-time adjustment methodology should yield the same result as varying the rate of return during operation.

The Board supports the one-time adjustment for two reasons. First, it should simplify future determinations in the operating phase of a just and reasonable rate of return for the pipeline. As financial conditions change over the next three or four decades, the rates of return

allowed for all pipelines will vary. If the one-time adjustment procedure were not adopted, it would become complicated to establish just and reasonable rates of return for the Northern Pipeline project.

The equity investors in the Northern Pipeline project could be entitled to an incentive rate of return either higher or lower than the rates allowed for other pipelines with comparable operating risks. In any future rate adjustment, these premiums or penalties should remain unchanged, even if rates of return for all pipelines were raised or lowered because of changing financial conditions.

If the one-time adjustment to the rate base is adopted, the future determination of rates of return for the Northern Pipeline can be made without having to consider the IROR mechanism or any penalties or premiums that were awarded for performance during the construction phase of the project. The one-time adjustment will continue to reflect those premiums, so that future rate of return determinations need only consider then-current conditions, not past events.

The second reason is that failure to adopt the one-time adjustment would complicate future financing for expansions or loopings of the Northern Pipeline project. The incentive rate resulting from good or bad cost control on the original pipeline construction should not apply to investments made years later on expansions of the system. Without the one-time adjustment, a separate rate of return and a separate rate base would have to be established for an expansion or looping.

For ratemaking purposes, it is proposed to consider the one-time adjustment to the rate base as an adjustment to the allowance for common equity funds used during construction. Such procedures are already necessary in cost-of-service calculations without an IROR mechanism, since the allowance for equity funds used during construction must be recognized as an expense in the cost-of-service determination. The common equity component of AFUDC, however, is not an expense for tax purposes but is recognized as a taxable component of the revenue derived from the cost-of-service.

D. Criteria in Determining Benchmark Rates of Return

1. Benchmark Rates of Return

Previous NEB decisions on the allowable rates of return on equity for natural gas pipelines can be primarily considered as corresponding to an Operation Phase Rate.

(a) Operation Phase Rate

Foothills (Yukon) has indicated previously that it is proposing a 75 per cent debt, 25 per cent equity capital structure. If this changes, it would change the return on common equity but would not necessarily change the return before taxes on rate base.

The NEB Decisions on the allowable return on equity for TransCanada PipeLines would appear to be relevant to determining the Operation Phase Rate.

Date	Percentage Common Equity	Return on Common Equity
July 1978	37.8	14.2
December 1976	32.9	14.5
December 1975	23.0	16.7
December 1974	18.2	17.7

A trend line fitted to these Decisions yields a return on common equity of 16.3 per cent for a capital structure containing 25 per cent common equity. TransCanada does not have a full cost-of-service tariff and for this reason has a higher risk than the Northern Pipeline. On the other hand, it is fully looped and in several sections has up to four loops and is, therefore, subject to lower operating risks. One unresolved feature in the Northern Pipeline in Canada is whether the return on common equity will be reduced if there is a service interruption caused by problems in the Alaska gas processing plants or pipeline or, in the pipeline south of the 49th parallel. The Board is using a return on common equity of 16.0 per cent in the preliminary draft, but will make a finding on the Operation Phase Rate after it has received the submissions of interested parties and the tariff issues on the Northern Pipeline have been resolved.

(b) Non-incentive Rate

The Non-incentive Rate reflects the premium for risk during the construction phase. The decision on the risk premium is one which must be based primarily on judgment. The Federal Energy Regulatory Commission has provided two percentage points for this risk in Alaska. For the purpose of this draft, the Board has used two percentage points north of Whitehorse, 1.5 percentage points

elsewhere in the Yukon and in Northern B.C. and Alberta, and one percentage point for the remainder of the pipeline, but will make a determination of the premium later.

(c) Centre Rate

The Centre Rate for the Incentive Rate of Return should be higher than the Non-incentive Rate because the Incentive Rate of Return implies variability as a result of cost-performance and, therefore, implies a greater degree of risk. The Federal Energy Regulatory Commission has provided a two percentage point spread to reflect this additional risk. The Board questions whether this is too high and, for the purpose of this draft, has used between 1.5 and 0.5 percentage points, depending on the zone, but will make a determination of the premium later.

2. The Marginal Rate

The Marginal Rate used by the Federal Energy Regulatory Commission is eight per cent and the basis for this percentage is described in Annex I. Traditionally, the cost of capital has been higher in Canada compared with the United States and the return on rate base for traditional pipeline companies is between 10 and 11 per cent.

For the purpose of this draft, the National Energy Board has used a marginal rate of ten per cent, but will make a determination of the rate to be used at a later date.

3. The Centre Point

The Federal Energy Regulatory Commission has used a Centre Point for Cost Performance of 1.3.

The logical Centre Point for Canada would appear to be 1.35 because of the incentive scheme in the Canada-U.S. Agreement.

Earlier, it was indicated that cost performance in each zone would probably correspond largely to difficulty of the terrain for pipelining as well as the severity of the weather for construction. The Board suggests at this time that the Centre Points proposed in the following table would realistically provide for this factor.

Capital Costs
of 56-inch 1080 PSI Pipeline

Zone *	Description	"Filed Costs" $million	Proposed Centre Point	Actual Cost if Centre Point is Achieved $ million
1	Alaska/Yukon - Whitehorse	707	1.45	1025
2	Whitehorse - Watson Lake	817	1.35	1103
3	Watson Lake - Fort Nelson	874	1.35	1180
4	Fort Nelson - Alta./B.C.	427	1.35	576
5	Alta./B.C. - Caroline	850	1.35	1148
6	Caroline - Empress	236	1.25	295
7	Caroline - Coleman	126	1.25	158
8	Coleman - Kingsgate	83	1.25	104
9	Empress - Monchy	205	1.25	256
	Total - Canada	4325	1.35	5845

* As per Annex II Canada/US Agreement

E. Proposed Incentive Rate of Return Schedule

1. Illustration of Proposed Rates

The following table illustrates the proposed Incentive Rate of Return in Canada based on:

	Zone 1 %	Zone 2, 3, 4, 5 %	Zone 6, 7, 8, 9 %
Operation Phase Rate	16.0	16.0	16.0
Non-incentive Rate	18.0	17.5	17.0
The Centre Rate	19.5	18.5	17.5
Marginal Rate	10.0	10.0	10.0

Cost Performance Ratio	Zone 1 Centre Point 1.45 IROR%	Zone 2,3,4,5 Centre Point 1.35 IROR%	Zone 6,7,8,9 Centre Point 1.25 IROR%
0.8	27.2	24.3	21.7
1.0	23.8	21.5	19.4
1.2	21.5	19.6	17.8
1.25			17.5
1.3	20.6	18.8	17.2
1.35		18.5	
1.4	19.8	18.2	16.7
1.45	19.5		
1.6	18.6	17.2	16.0*
1.8	17.7	16.4	16.0*
2.0	16.9	16.0*	16.0*
2.2	16.3	16.0*	16.0*
2.4	16.0*	16.0*	16.0*

*Minimum IROR of 16.0

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2. Comparison with United States Proposal

	U.S. Proposal* for Alaska	Canadian Proposal: Yukon N. of Whitehorse	Canadian Proposal: Other Yukon N. B.C. N. Alta.	Canadian Proposal: Other
	%	%	%	%
Rates of Return				
Operation Phase Rate	13	16.0	16.0	16.0
Non-incentive Rate	15	18.0	17.5	17.0
Centre Rate	17	19.5	18.5	17.5
Marginal Rate	8	10.0	10.0	10.0
Centre Point	1.3**	1.45	1.35	1.25

* Excludes effect of investment tax credit

** Effect of Inflation eliminated, and scope changes permitted

Conditions under which Regulations would be Varied

1. Rate of Return

(a) Financing Plan

The rates shown above are based on the financing plan outlined in the National Energy Board Hearing. Any significant change in the risks applicable to common equity would necessitate a reconsideration of these rates.

(b) Capital Structure

Any change in capital structure from 25 per cent common equity could cause a reconsideration of these rates.

(c) Changing Conditions in Gas Pipeline Industry

The Operation Phase Rate could change in the operating period if the rates of return generally applicable to natural gas pipelines changed.

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(d) Pre-building

The above examples assume that pre-building of the southern sections of the line in Canada does not take place.

The Canada-U.S. Agreement did not provide for the circumstances should pre-building occur. It has been suggested that for the purpose of comparing actual construction costs with "filed capital costs" of the pre-built section for purposes of determining the Dawson-Whitehorse tariff payable by U.S. shippers, that actual construction costs should be the actual construction costs net of normal depreciation costs when the assets commence to be used for carrying Alaska gas. This in turn raises the question of the basis of determining the incentive rate of return for the pipeline company and whether it should be determined when "leave to open" is granted or when placed in service for Alaska gas.

These are matters still to be negotiated by the Canadian and United States governments and are included here merely to illustrate that the IROR Scheme for the southern sections of the line cannot be resolved until questions relating to pre-building have been clarified.

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2. Acts of God and other Unforeseen Circumstances

The Canada-U.S. Agreement provides for the comparison of actual construction costs with filed capital costs.* The Agreement also provides for the adjustment of filed costs on the basis established therein with the concurrence of both governments.

Over and above these circumstances, the Regulations may be modified if Acts of God and other unforeseen circumstances occur.

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* The estimates are the "filed capital costs" in the Canada-U.S. Agreement.

ATTACHMENT
October 5, 1978

NORTHERN PIPELINE ACT

Regulations made pursuant to Section 36 of the Northern Pipeline Act on the Incentive Rate of Return (IROR) and related Tariff Matters

Short Title

1. These Regulations may be cited as the "Northern Pipeline IROR Regulations".

Interpretation

2. In these Regulations

"Act" means the Northern Pipeline Act,

"Actual Construction Costs" means the actual costs of construction at the time "leave to open" is granted by the National Energy Board, including estimates of cost incurred but not yet booked and allowance for funds used during construction and monitoring costs (Section 29 of the Act), and excluding working capital, property taxes, the road-related charges in the Yukon Territory of up to $30 million, and:

> ". . . the effect of increases in cost or delays caused by actions attributable to the U.S. shippers, related U.S. pipeline companies, Alaskan producers, the Prudhoe Bay deliverability or gas conditioning plant construction and the United States

. . . 2

> or State Governments. If the appropriate regulatory bodies of the two countries are unable to agree upon the amount of such costs to be excluded, the determination shall be made in accordance with the procedures set forth in Article IX of the Transit Pipeline Treaty." (Annex III)

as set forth in Schedule I of the Act,

"Allowance for Funds Used During Construction", (AFUDC), has the same meaning as Interest During Construction in the Gas Pipe Line Uniform Accounting Regulations of the National Energy Board.

"Centre Point" means that Cost Performance Ratio which is associated with the Centre Rate,

"Centre Rate" means the rate of return on equity equal to the sum of the Operation Phase Rate, the Project Risk Premium and the IROR Risk Premium and is the Centre Rate applicable to the Centre Point Cost Performance Ratio,

"Cost Performance Ratio" means an index of the degree of cost overruns which is Actual Construction Costs over filed capital costs,

"Equity" means common equity,

"Filed Capital Costs" means the filed capital costs in Schedule I of the Act, which costs exclude working capital, property taxes, and the provision for road maintenance in the Yukon Territory of up to $30 million,

"Incentive Rate of Return" means the rate of return on common equity as determined from Schedule II and as illustrated in Schedule III,

"Marginal Rate" means the return on the incremental dollars invested in common equity to move from one cost performance ratio to another,

"Non-incentive Rate" means the rate of return on equity equal to the sum of the Operation Phase Rate and a Project Risk Premium for those construction and completion risks unique to the pipeline,

"Operation Phase Rate" means the rate of return on equity allowed on natural gas pipelines in Canada of similar operating risk,

"Pipeline" has the same meaning as in the Act.

Purpose

3. The purpose of these Regulations is to implement the Incentive Rate of Return Scheme referred to in Part II and section 4 of Schedule I of the Act.

Application

4. These Regulations apply to all companies constructing and operating the pipeline.

5. (1) Allowance for Funds Used During Construction (AFUDC) shall be determined monthly.

(2) In respect of debt and preferred stock AFUDC shall be the actual cost incurred, and for the common equity component it shall be one-twelfth of the non-incentive rate applied to the average balance in the common equity accounts for the previous month, including the common equity component of the previously capitalized AFUDC.

(3) The Board shall approve the amount of AFUDC to be capitalized.

6. The rate of return on common equity shall be as set forth in Schedule I.

7. The Centre Point for each zone, as defined in Annex II of Schedule I to the Act, is shown in Schedule I.

8. Schedule I shall be used to determine the formulae for the Incentive Rate of Return in Schedule II.

9. The Incentive Rate of Return for each zone shall be determined according to the formulae contained in Schedule II.

10. (1) A one-time adjustment to the rate base shall be determined for each zone by

(a) calculating the common equity component applicable to the actual construction costs, including AFUDC, and determining the dollar value of the common equity component in each of the 25 operating years on the assumption that the common

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equity is fully recovered by depreciation charges in equal annual installments over the 25-year period,

(b) applying the difference between the Incentive Rate of Return for each zone derived from Schedule II and the Operation Phase Rate to the dollar value of the common equity component in each year,

(c) calculating the present value of the stream of income using the Operation Phase Rate as the discount rate, and

(d) adding the present value determined in (c) to the rate base.

(2) The Board shall approve the determination of the one-time adjustment to rate base.

11. The rate base for rate-making purposes shall include working capital determined according to normal regulatory practice.

12. The one-time adjustment to rate base shall be amortized at the same rate as AFUDC.

13. The Incentive Rate of Return and its application as described in these Regulations may be varied if:

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(a) any significant change in the risks applicable to common equity occurs due to a change in the financing plan from that envisaged at the time the rate was determined,

(b) the capital structure varies significantly from 25 per cent common equity on completion of the pipeline,

(c) the rates of return generally applicable to other natural gas pipelines change;

(d) pre-building of the southern sections of the pipeline in Canada is authorized, or

(e) Acts of God or other unforeseen circumstances occur.

Schedule I

	Zone 1 %	Zone 2, 3, 4, 5 %	Zone 6, 7, 8, 9 %
Operation Phase Rate	16.0	16.0	16.0
Non-incentive Rate	18.0	17.5	17.0
Centre Rate	19.5	18.5	17.5
Marginal Rate	10.0	10.0	10.0
Centre Point	1.45	1.35	1.25

Schedule II

	Incentive Rate of Return*
Zone 1	$\frac{13.775}{\text{Cost Performance Ratio}} + 10$
Zones 2, 3, 4, 5	$\frac{11.475}{\text{Cost Performance Ratio}} + 10$
Zones 6, 7, 8, 9	$\frac{9.375}{\text{Cost Performance Ratio}} + 10$

* but shall not be less than 16.0%

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Schedule III

Illustrative Rates Derived from Schedule II

Cost Performance Ratio	Zone 1 %	Zone 2, 3, 4, 5 %	Zone 6, 7, 8, 9 %
From 0.7 but less than 0.9	27.2	24.3	21.7
0.9 " " " 1.1	23.8	21.5	19.4
1.1 " " " 1.25	21.7	19.8	18.0
1.25 " " " 1.35	20.6	18.8	17.2
1.35 " " " 1.5	19.7	18.1	16.6
1.5 " " " 1.7	18.6	17.2	16.0
1.7 " " " 1.9	17.7	16.4	16.0
1.9 " " " 2.1	16.9	16.0	16.0
2.1 " " " 2.3	16.3	16.0	16.0
2.3 and over	16.0	16.0	16.0

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Charles B. Curtis, Chairman; Don S. Smith, Georgiana Sheldon; Matthew Holden; and George R. Hall.

Incentive Rate of Return for The Alaska Natural Gas Transportation System	)))	Docket No. RM78-12

REVISED NOTICE OF PROPOSED RULEMAKING

(Issued September 15, 1978)

Notice is hereby given, pursuant to the Administrative Procedure Act (5 U.S.C. Sec. 553), the Natural Gas Act, Sections 4, 5, 7, and 16 (15 U.S.C., Sections 717c, 717d, 717f, and 717o), and the Alaska Natural Gas Transportation Act, Section 9 (15 U.S.C., Section 719g), that the Federal Energy Regulatory Commission (Commission) is considering the adoption of revised terms and conditions concerning an incentive rate of return (IROR) on equity for the certificates of public convenience and necessity for the Alaska Natural Gas Transportation System (ANGTS). Conditional certificates were issued by the Commission on December 16, 1977 (Alcan Pipeline Company, et al., Docket Nos. CP78-123, CP78-124, and CP78-125).

On May 8, 1978, in a Notice of Proposed Rulemaking, the Commission announced that it is considering the adoption of terms and conditions concerning an IROR on equity for the certificates of public convenience and necessity for the ANGTS.1/ In this notice, the Commission invited interested parties to submit written comments on the proposed rule by May 31, 1978. By notice issued May 26, this comment period was extended to June 14, 1978. Parties were also allowed to file reply comments by June 23, 1978. Though some of these comments were received after the extension period, the Commission has considered all of the comments in revising the terms and conditions first proposed in the May 8 notice.

1/ 43 Fed. Reg. 20245-20246 (May 11, 1978).

The Commission will entertain further comments from interested parties on the revised terms and conditions presented herein. An abbreviated comment period is provided, for the Commission intends expeditious adoption of the proposed rule.

Incentive Rate of Return for)
The Alaska Natural Gas) Docket No. RM78-12
Transportation System)

OUTLINE OF CONTENTS

I. INTRODUCTION

The Commission received 24 comments on the proposed rulemaking from interested parties. Two comments were received from the Commission staff: one from the Office of Regulatory Analysis and another from the Office of Pipeline and Producer Regulation.

Three state governments or regulatory agencies filed comments: the State of Alaska, the State of California and the Public Utilities Commission of the State of California, and the Public Service Commission of the State of New York.

Three comments were received from companies that have applied for certificates to build and operate a segment of the ANGTS: Alaskan Northwest Natural Gas Transportation Company, Northern Border Pipeline Company, and Pacific Gas Transmission Company and Pacific Interstate Transmission Company.

Twelve comments were received from other interstate natural gas pipeline companies: Columbia Gas Transmission Corporation, Michigan Wisconsin Pipeline Company, Northern Natural Gas Company, Natural Gas Pipeline Company, Northwest Pipeline Company, Panhandle Eastern Pipe Line Company, Texas Gas Transmission Corporation, Tennessee Gas Pipeline Company and Midwestern Gas Transmission Company, Transcontinental Gas Pipe Line Company, Texas Eastern Transmission Corporation and Trans-Western Pipeline Company, Texas Gas Transmission Corporation, and United Gas Pipe Line Company.

Four comments were received from other interested parties: the American Gas Association, the Southern California Edison Company, the Upper Tanana Development Corporation, and the Williams Brothers Engineering Company.

Having evaluated these comments, the Commission issues this revised notice in order to incorporate improvements suggested by valid criticisms and to respond to criticisms with which the Commission does not agree. In addition, this revision includes further discussion of the concept and design of the IROR, in order to clarify the IROR proposal and to establish a common conceptual ground for further comment.

The revised proposal includes five changes to the terms and condition originally proposed in the May 8 notice:

1. Certain concepts have been restated to make them more readily understood.

2. The method of adjusting for inflation in determining the Cost Performance Ratio has been altered to more equitably remove the effects of inflation from the workings of the IROR.

3. The condition listing certain changes in scope for the project has been deleted. The subject of changes in the scope is a matter of utmost importance but will require further time to resolve; therefore the Commission will consider it in a separate rulemaking to be initiated as soon as appropriate staff work and studies have been completed.

4. The one-time adjustment to the rate base will be calculated so as to account for the entire difference between the incentive rate of return and the equity rate that would be earned on a pipeline of comparable operating risk.

5. Application of the IROR concept to the Western Leg has been dropped.

In addition to these changes in terms and conditions, this notice of proposed rulemaking invites comment on a revised IROR schedule which the Commission believes to be more realistic than those examples set forth in the previous notice. The actual values that will apply, as well as the permissible rates of return based thereon, of course, must be evaluated and determined in an evidentiary proceeding.

The construction of the example is also based on the assumptions that (1) the final cost estimates filed with the Commission, after adjustment for inflation and changes in pipeline design and routing, will not differ significantly from those submitted in March 1977, and (2) the separate change of scope rulemaking will not significantly reduce the risk borne by the project sponsors. Any changes in that risk must lead to corresponding changes in the allowed compensation for bearing such risk.

II. THE INCENTIVE RATE OF RETURN CONCEPT

A. Purpose of an Incentive Rate of Return

The President's Decision on the Alaska Natural Gas Transportation System mandates the use of an incentive rate of return (IROR) to deter cost overruns during the construction of this project.

The traditional tool for cost control in pipeline construction has been regulatory oversight, with the attendant threat of disallowing any investment imprudently incurred during construction. Such a regulatory approach, however, is a blunt instrument that is effective only to counteract extreme cases of management's lack of foresight or diligence. Before any costs may be disallowed from the rate base they must be shown to have been imprudently incurred, which implies that only those costs attributable to patently unreasonable management action may be disallowed.

A regulated utility has an economic incentive to increase its return by expanding its rate base and the negative incentive to avoid disallowance of imprudently incurred costs.2/ Better cost-control awareness should be obtained by providing

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2/ The Commission recognizes that additional incentives to control cost of service on this project are created by the sponsors' interest in insuring marketability for the delivered gas.

as an incentive for the utility the reward of a greater return. This sort of incentive operates for competitive industries but is generally absent under conventional utility regulation.

The economic impetus toward cost control will be achieved by tying the allowed Rate of Return to the degree of cost overrun experienced on the project: superior cost control will be rewarded with a higher rate of return. The IROR is designed to complement the disallowance of costs mechanism by offering economic rewards for holding down all costs. Thus, project managers will be rewarded for eliminating costs which are avoidable, even though the costs, if incurred, would later have been classified as "prudent." Without IROR, all prudent costs would simply be included in the rate base, and there would be only the most general impetus to attain superior cost control. With the economic incentives embodied in the IROR, the project sponsors will find it in their own interest to seek out and use opportunities to reduce any construction costs that could be reduced. Project managers are in a much better position to detect such opportunities than is the Commission, and the degree of regulatory oversight can be scaled down.3/

Under the conventional regulation approach, consumers are forced to bear all the costs of overruns, since increased costs may be required to be added to the rate base. Under the IROR policy, however, the burden of cost overruns will be distributed between consumers and equity investors. Investors, the group to which management must answer, will benefit from superior cost-control results. Also, the consumer interest will be served by assurance that there is a sharing of the risks of cost overruns.

In sum, the IROR should lead to savings in construction costs, which will be divided between lower costs to consumers and higher returns to investors as a reward for cost control. Thus, the ultimate effect of applying IROR to hold down costs will be to provide lower-cost gas to consumers and just and reasonable returns to investors.

3/ We further note that the IROR concept is useful when a selection must be made among competing applications and where the relative ability to control costs is a material factor in the selection. IROR rewards the successful applicant if its performance matches its projections.

To reach this goal, the Commission proposes to incorporate the following principles for designing the IROR, each of which is discussed more fully in later sections:

1) The IROR must provide incentives to reward cost control performance and avoid or minimize cost overruns.

2) The IROR must provide just and reasonable compensation for investors, in order that sufficient capital may be attracted to finance the project.

3) The cost to consumers should be lower where cost overruns have been minimized and investors have been awarded an incentive return.

B. Establishing an Incentive Rate of Return Schedule

The Commission, in the rulemaking here proposed, will design the IROR schedule so as to accomplish the goals of the rulemaking. The design consists quite simply of attaching a separate Rate of Return to each level of cost control performance. Careful consideration is required in order to design an effective schedule that will yield the desired effect.

1. Benchmark Rates of Return and Risk Premiums

As a starting point for setting the IROR schedule, certain rates of return can be used as benchmarks. These benchmark rates of return are specifically linked to the various types of unusual risk facing this project.

a. Operation Phase Rate: This is the rate of return to be allowed on the adjusted rate base. It is a starting point for determining the actual incentive rate that will be allowed. This rate should be the rate allowed on pipelines of similar operating risk without allowance for any special construction and completion risks of the Alaska pipeline. (These risks are compensated for with the Non-Incentive Rate, described below.)

b. Non-Incentive Rate:4/ This rate is arrived at after evaluating the special risks inherent in the Alaska project. It equals the sum of the operation phase rate and a project risk premium for those construction and completion risks unique to the Alaska Pipeline project. This rate, which does not account for the IROR risk, is the rate which would be granted after conventional regulatory proceedings.

c. Center Rate: The Center Rate includes compensation for all risks associated with the project. Specifically, it reflects the Operation Phase Rate, the Project Risk Premium, and the IROR Risk Premium. (The Center Rate is equivalent to the Non-Incentive Rate plus the IROR Risk Premium.) The IROR Risk Premium is to compensate investors for the risk introduced by the variability in the allowed rate of return implied by adoption of IROR. The Center Rate will be earned if actual project costs equal the forecasted level of cost overruns, after adjustment for inflation and changes in scope (the subject of a separate proceeding).

In establishing these benchmark rates of return, the Commission's primary consideration will be to determine the just compensation for bearing the risks of this project. These risks are affected by (among other factors):

o The type of cost-of-service tariff to be granted for this project.

o The beneficial effect on marketability of the Alaskan gas if its cost is rolled in with the cost of other gas.

4/ In the May 8, 1978 notice, the Non-Incentive Rate was referred to as the "Normal Rate of Return." This was meant to signify the rate which would have been determined in normal regulatory proceedings if the IROR were not being applied. The "Normal Rate" was widely misunderstood to be the rate earned on normal pipeline operations. Thus, for clarity, the rate of return referred to in the May 8 notice as the "Normal Rate of Return" will henceforth be called the "Non-Incentive Rate."

- The unusual construction and non-completion risks faced by this pipeline.
- The financial plan and final capital structure developed by the project sponsors.
- The variability in allowed rates of return imposed by the IROR.
- The degree of flexibility allowed in adjusting estimated costs.

2. Cost Performance Ratio 5/

The Cost Performance Ratio is an index of the degree of cost overruns or underruns. It is simply the ratio of actual construction costs, including an allowance for funds used during construction (adjusted for inflation), divided by estimated construction costs (adjusted for any changes in scope):

$$\text{Cost Performance Ratio} = \frac{\text{actual costs}}{\text{estimated costs}} = \frac{\text{Deflated Actual Rate Base}}{\text{Projected Rate Base}}$$

In the proposal, this is the ratio between the Deflated Actual Rate Base and the Projected Rate Base as defined in the conditions below. The Deflated Actual Rate Base is derived from the actual construction costs and schedule according to standard procedures followed by all pipelines, and includes the allowance for funds used during construction (AFUDC). The Projected Rate Base is the rate base derived from the Final Cost and Schedule Estimates submitted by the applicants.

The IROR schedule relates a rate of return to each Cost Performance Ratio. As the ratio increases, signifying overruns, the associated rate of return decreases.

3. The Marginal Rate of Return

a. The concept of the marginal rate

Any schedule relating increased costs to the allowed rate of return on equity established by this Commission

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5/ For purposes of determining cost performance ratios, the term "rate base" is used to refer to capital or investment costs and is not intended to refer to rate base in the conventional sense.

(the IROR schedule) will imply or define at least one marginal rate of return. This Commission must consider that marginal rate in order to determine the cost-control incentive created by the schedule. Similarly, equity investors or project sponsors must consider the implicit marginal rate in order to determine the rewards available to them for holding down cost overruns. The relationship of the marginal rate to the investors' cost of capital determines the amount of effort that is economically justified to avoid cost overruns.

The marginal return is the return on the incremental dollars invested to move from one cost performance ratio to another. To illustrate:

Cost Ratio	Allowed ROR
1.2	17.8%
1.3	17.0%
1.4	16.4%

Assume that the ratio of 1.3 has already been reached shortly before project completion. Then, in order to complete the project, more funds must be invested and a ratio of 1.4 must be reached. If the project had been completed at 1.3 (30% overrun), the allowed ROR would have been 17.0%. Since the project may actually be completed at 1.4 (40% overrun), the allowed ROR on all equity is decreased to 16.4%. Given these rates of return, it follows that the actual return earned on the additional dollars invested to move from 1.3 to 1.4 (regarded as 1.3 and 1.4 million dollars, the incremental investment is then 0.1 million dollars) is 8%. This results from the following calculation.

$$\frac{(\text{earnings at } 1.4) - (\text{earnings at } 1.3)}{\text{increase in rate base}}$$

$$= \quad \frac{(1.4)(.1636) - (1.3)(.17)}{1.4 - 1.3}$$

$$= \quad .08 \quad = 8\% \text{ marginal return.}$$

Once again, the rate of return on the additional 0.1 million dollars is 8.0%, even though the rate of return on the entire 1.4 million is 16.4%.

b. The importance of the marginal rate

The investors seek to invest funds so as to earn a rate of return higher than the cost of the capital. If capital costs more than an investment earns, then that investment will not be made.

An investor's profits will be maximized only when each unit of capital invested is itself as profitable as possible. The project sponsors plan to assemble a pool of capital large enough to finance any degree of cost overrun which has a substantial probability. A marginal rate below the cost of capital will give the project sponsors an extra incentive to avoid having to finance the overrun in order to insure that parts of that pool will be available for future projects whenever possible.

Under IROR, an investor faced with the prospect of financing cost overruns will examine the return on his investment of the additional unit of capital necessary to pay for the overrun. If he finds that return to be lower than his cost of capital, he will strive to avoid having to undertake the investment which the overrun requires.

The marginal rate must be set below investor's cost of capital if the IROR is to offer rewards for reducing overruns. If the marginal rate were above the cost of capital, then overruns might be attractive equity investments, and the IROR would have failed its primary purpose.

The marginal rate, and thus the degree of incentive, can be set independently of the Center Rate. An IROR schedule can maintain the same incentive to control costs, even though the overall level of compensation in the schedule might be moved up or down.

Since the calculation of the Cost Performance Ratio includes the AFUDC, a low marginal rate also provides incentives for avoiding construction delays. If construction is delayed, the AFUDC account grows. This raises the Deflated Actual Rate Base and the Cost Performance Ratio, with a corresponding decline in the allowed rate of return. Therefore, meeting the construction schedule will avoid penalties in much the same way as does reducing cost overruns.

4. The Center Point

One of the Cost Performance Ratios must be chosen as the starting point for constructing the IROR schedule. Once that point has been assigned a rate of return, and the marginal rate has been chosen, the entire schedule can be determined.

The Center Point is that Cost Performance Ratio which is associated with the Center Rate of Return. Ratios above the Center Point will yield rates of return below the Center Rate. Ratios below the Center Point will be rewarded as underruns, with rates of return greater than the Center Rate.

In order for the Center Rate to be perceived by investors as adequate compensation for risk, it should be the rate of return that they can realistically expect their investment to yield. As a result, the Center Point should be set at the most likely Cost Performance Ratio. Then, if the final costs are at the expected levels, the Center Rate will be earned.

C. One-time Adjustment to the Rate Base

In order to facilitate analysis and exposition of the subject, the discussion has up to this point been based on the premise that the Incentive Rate of Return would apply to actual construction costs; that is, a varying rate of return would be used as the incentive mechanism.

The proposed rulemaking accomplishes an equivalent result by adjusting the rate base and allowing the Operation Phase Rate on the adjusted rate base. The present value of the revenues

provided by application of the Operation Phase Rate to the adjusted rate base would equal the present value of the revenues provided by application of the allowed Incentive Rate of Return to the actual rate base.6/

The procedure for determining the one-time adjustment is: (1) project the equity portion of depreciation and the after-tax return on equity over the life of the pipeline, based on the Incentive Rate and the conventional rate base; (2) calculate the present value of this stream of income, using the Operating Phase Rate as the discount rate; and (3) replace the existing equity investment in the pipeline at the time of start-up with this present value total.7/

6/ In the notice of May 8, the Commission proposed a one-time adjustment to the rate base upon commissioning or start-up of pipeline operations. This adjustment would have been equivalent in present value to the difference between the Incentive Rate (determined by the degree of cost control measured by the Cost Performance Ratio) and the Non-Incentive Rate of Return. In this notice, we instead propose to make a one-time adjustment equivalent to the difference between the Incentive Rate and the Operation Phase Rate. In this way, all of the unusual risks faced during the construction period (including risk due to IROR) will be compensated for by the one-time adjustment. Future rate of return determinations will then be based on consideration of the operating risks only.

7/ Some of the comments argue that uncertainties about the future operation of the pipeline will make the present value of the return of equity and the return to equity uncertain and thus make the precise size of the one-time adjustment uncertain. The Commission agrees that it is impossible to predict with certainty such things as throughput, tax rates, operation costs, or ultimate capacity. The type of cost-of-service tariff that this Commission is likely to approve will provide a high degree of certainty as to the return of equity and the return to equity over the life of the project, once the size of the equity investment and the allowed rate of return are fixed.

This one-time adjustment procedure does not change the present value of the project's revenue stream, as compared to the incentive rate of return. Because of this, the one-time adjustment methodology should yield the same result as varying the rate of return during operation.

The Commission, however, selects the one-time adjustment for two reasons. First, it will simplify future determinations of a just and reasonable rate of return for the pipeline. As financial conditions change over the next three or four decades, the rates of return allowed for all pipelines will vary. Under the one-time adjustment to the rate base herein adopted, the future determination of rates of return for the ANGTS can be made without having to consider the IROR mechanism or any penalties or premiums that were awarded for performance during the construction phase of the project. The one-time adjustment will continue to reflect those premiums, so that future rate of return determinations need only consider then-current conditions, not past events.

The second reason is that failure to adopt the one-time adjustment would complicate future financing for expansions or loopings of the Alaskan gas project. Certainly the risks of participation in the project now are materially different from those to be associated with investments made years later on expansions of the system.8/ Without the one-time adjustment, a separate rate of return and a separate rate base would have to be established for an expansion or looping. Additionally, performance in controlling costs in constructing the initial system should not prejudice additions to, or expansions of, that system.

8/ The project sponsors have already provided some recognition of the changing nature of project risks as the project progresses with the discount schedule for late entry which was made part of their Partnership Agreement. The Commission endorsed that concept in approving the relevant portion of the Partnership Agreement by order of June 30, 1978, in Docket No. CP78-123 (at pp. 7-11), and seeks to reinforce it with the rate base adjustment methodology.

III. SUMMARY AND EVALUATION OF COMMENTS ON THE MAY 8, 1978 NOTICE

One of the Commission's purposes in issuing this revised notice is to reduce the confusion surrounding the IROR concept which was apparently caused by the May 8 notice. To that end, the preceding section was intended to clarify the concept, design, and operation of an IROR mechanism.

This section specifically addresses many of the comments filed in response to the May 8 notice. All comments were carefully considered. Some contained valid criticisms and suggestions. The Commission incorporated these in its revised proposal.

A. Applicability of the IROR

1. Proposals to Completely Abandon IROR

Several of the comments on the proposed rulemaking of May 8, 1978, advocate outright abandonment of the entire IROR concept. The major arguments are (a) that the Commission is not legally required to employ IROR, and (b) that other, existing cost-control devices are adequate.

The second argument has been addressed in section I of this notice. As for the first argument, the legal requirement on the Commission to establish some type of incentive mechanism stems both from the Agreement on Principles with Canada (Agreement) and from the President's Decision and Report to Congress on the Alaska Natural Gas Transportation System (Decision).

The Agreement governs the two countries' plans to implement the joint project and was made a part of the President's Decision. The Decision gained the force of law when it was approved on November 2, 1977, by joint resolution of the Congress. 9/

9/ Act of November 8, 1977, Publ. L. No. 95-158, 91 Stat. 1268 (1977).

Section 4(b) of the Agreement states: 10/

> . . . the return on the equity investment in the Pipeline will be based on a variable rate of return for each company owning a segment of the Pipeline, designed to provide incentives to avoid cost overruns and to minimize costs consistent with sound pipeline management.

The "Pipeline" referred to in this passage is defined in Annex I to the Agreement. It includes all segments of the Project other than those in the lower 48 states. Thus, the Agreement, through its inclusion in the Decision and its subsequent approval by Congress and by the Government of Canada, requires the application of some type of incentive system to the Alaskan and Canadian portions of the project.

In addition, the Terms and Conditions of the Decision (Section 5) could be read as requiring the application of some type of incentive system to the entire project, as spelled out in the following passage: 11/

> If the direct capital cost estimates. . . for the overall project. . .materially and unreasonably exceed the comparable capital cost estimates filed by Alcan. . .on March 8, 1977,. . .the FPC may not issue a certificate for the project. If these final capital cost estimates are not excessive under the above standard, the FPC *may* use these final estimates for the U.S. segments as the basis for fixing a variable rate of return on equity that will reward the applicant for project completion under budgeted cost and penalize the applicant for project completion above budgeted cost. The variable rate of return shall be set to provide substantial incentives to construct the project without incurring overruns. [Footnotes omitted.] [Emphasis added.]

10/ *Decision*, p. 51.

11/ *Decision*, p. 36.

Various comments argued that the term "may" in this section of the Decision gave the Commission flexibility in choosing whether to impose an incentive mechanism. Such an interpretation, however, is inconsistent with the entire theme and purpose of the President's Decision. The proper interpretation is that the Commission must fix an incentive system for the project but may use the final capital cost estimates filed with the Commission prior to certification as the basis for that system. In other words, the Decision allows the Commission to select the basis for the mechanism, but requires that a mechanism be imposed. Further, since Section 5 specifies terms and conditions for the entire project, we deem the Commission to be required by the Decision to assure that some type of incentive mechanism exists on all segments of the ANGTS.

The reason that the Decision requires imposition of an incentive mechanism to control costs is to protect the consumer and also to facilitate private financing of the project. The President in the Report left the implementation of such a mechanism to the Commission, with instructions "to balance the economic incentive with administrative feasibility." 12/ While the President spoke in general terms of a variable rate of return, therefore, the Commission was at the same time given sufficient discretion in implementing the incentive mechanism to avoid a result which is not in the public interest. As discussed below in Section IV. C, the Commission, after balancing economic incentive against administrative feasibility, believes that application of the IROR to the Western Leg segment of ANGTS is neither appropriate nor mandated.

2. Application to Segments in the Lower 48 States

A number of the comments argued that it is unnecessary to apply the IROR mechanism to segments of the ANGTS in the lower 48 states, because the potential for cost overruns on these segments is much less than in Alaska.

It has already been shown that the Decision requires the existence of some type of incentive system to the entire project. Even if it were not a legal requirement, however,

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12/ Report, p. 123.

it would be in the public interest to apply the IROR mechanism to the Alaskan and Northern Border segments of the ANGTS. The need for economic incentives throughout regulated industries was explained in the Introduction, and the need for such incentives to reduce costs on the lower 48 segments is just as real as on the Alaskan and Canadian portions of the project.

The difference between the Arctic segments and the conventional segments is in the degree of certainty in cost estimates. It is more difficult to predict Arctic construction costs than to predict the costs of conventional construction. Consequently, even though non-overrun incentives may be the same, higher overruns may be incurred on the Arctic segments. It does not therefore follow, however, that cost-control incentives are not needed on the conventional construction segments. All of the reasons for applying some type of incentive system to the Arctic segments are equally valid for the conventional construction segments.

Some comments asserted that there are major practical problems in trying to apply an IROR mechanism to the Western Leg, because it will be part of existing operating systems and would not be project financed. Slightly different procedures would be needed for the Western Leg, but there appear to be no insurmountable problems in developing these procedures. 13/ The Commission has decided not to apply IROR as herein described to the Western Leg, however, because the net effect of doing so would be to increase costs to consumers. On the assumption that the financing plan for the Western Leg, which was presented to the President and made part of the report accompanying his Decision, is the one which is utilized, we believe that other, existing incentives to reduce construction costs are adequate for this segment of the system. (See section IV. C.)

13/ In some respects it is less complicated to apply the IROR mechanism to conventional lower 48 pipelines. Because the construction technology and pipeline design are more familiar, there are fewer uncertainties in the cost estimates. Thus, the problem of changes in scope or changes in cost beyond the sponsors' control is reduced.

Another problem mentioned in the comments is that parts of the lower 48 segments might be built in advance of the Alaskan segment in order to carry Canadian gas.14/ Even so, we propose to apply the IROR mechanism to the Northern Border facilities. These facilities are part of the ANGTS, and thus application of some type of incentive mechanism is required by the Decision.

3. Designing Different IROR Schedules for Different Segments

Both the Office of Regulatory Analysis and the Office of Pipeline and Producer Regulation argued that different IROR schedules would be appropriate for each segment of the project. Their comments made two points:

(a) A major consideration in designing the IROR schedule is risk compensation. The investors must be adequately rewarded for bearing the risks of non-completion, as well as the risks that severe overruns will lead to lower rates of return through the operation of the IROR. These risks differ among the segments of the project, and the associated risk premiums awarded to investors should therefore correspond to the actual risks of each segment.

(b) The differences in the probable severity of cost overruns may imply that different incentives should be used for each segment: where overruns are easy to avoid, a weaker incentive may be adequate.

Both these points argue for the design of separate IROR schedules for the different project segments. The Commission agrees with the first argument and will consider setting different values for the Center Rate and the Center Point for each segment to compensate for differences in risk. As to the second argument, however, the Commission at this time sees no reason to believe that the difficulty of searching out and implementing opportunities to reduce costs will vary between segments.

14/ A conditional import authorization was issued on June 7, 1978. Northwest Alaskan Pipeline Company, Docket Nos. CP78-123, et al.

4. Exempting Certain Equity Funds from IROR

The State of Alaska argued in its comments that the holders of convertible debentures would have no control over cost overruns, yet would be subject to the established Incentive Rate of Return upon conversion of the debt to equity. Thus, certain investors could be penalized for behavior over which they claim to have no control.

It seems unlikely, however, that holders of convertible debt will have no control over costs. It will be in their interest to ensure cost reduction, and the negotiation of their indenture agreement should allow them an opportunity to exert their influence over cost control procedures. Furthermore, the administrative problems involved in exempting certain equity funds from the Incentive Rate may be significant, especially if the Operation Phase Rate is changed in the future.

B. Effect of IROR on Project Financing

1. Project Feasibility

Alaskan Northwest, in its comments filed June 13, 1978, claims that the IROR mechanism will prevent private financing of the project. It then offers an alternative which it terms acceptable. The alternative, however, is identical in concept to the IROR mechanism contained in this draft revision. It cannot be the company's argument, therefore, that the general idea of IROR could prevent financing. Rather, it must be protesting the details and parameter values contained in the first notice.

The IROR schedule is designed so that investors will reject the project only if they anticipate overruns so high that the project would no longer be in the public interest. 15/ At all lower levels of anticipated overruns, however, the allowed rate of return will be high enough to attract investors to the project.

15/ In the Decision (p. 180) it is estimated that an increase in direct capital costs of 124% (in constant dollars) over the March 1977 estimates would make the project uneconomic from a national point of view.

In order to ensure capital attraction, the Commission will build into the IROR schedule two important features:

(a) A risk premium to compensate investors for the special risks imposed by the IROR will be included in the Center Rate. This premium will be in addition to the compensation for the risks due to construction and operation. It will be designed to compensate investors for the fact that the IROR imposes variability on their possible returns.

(b) The IROR schedule will be designed so that rates of return below those of other investments will result only if cost overruns reach an unacceptably high level. 16/ If potential investors reject the project because of the risk that the IROR mechanism will produce a low return, it will be because they place a higher probability on large cost overruns than does this Commission.

16/ A number of comments argue that any IROR schedule which allows for the possibility, no matter how remote, that the allowed rate of return might fall below that of comparable investments in the U.S. economy would be unjust, unreasonable, and confiscatory, depriving investors of their property in violation of the Constitution. In the case of a pipeline for which no IROR mechanism has been established, the Commission concedes that it would normally be unreasonable to lower the rate of return below rates earned in other comparable investments after the pipeline had been constructed and after equity owners had invested their money. However, prior to the expenditure of any funds for construction of this project, this Commission will establish an IROR schedule that will tie the allowed rate to cost control, clearly a valid regulatory purpose. As long as the principles of this mechanism are clearly specified in advance of construction, are fairly applied, and are agreed to by the investors, it can hardly be termed either unreasonable or confiscatory if poor cost control produces a rate of return below that earned on other investments. cf; FPC v. Sierra Pacific Power Company, 350 U.S. 348 (1956) and United Gas

(Footnote continued on following page)

In addition to providing rates of return adequate to compensate for the risks of this project, the IROR will provide return rewards for controlling costs. This feature should be looked upon favorably by investors.

Prior to final certification, the sponsors will be required to show that they have obtained debt and equity capital sufficient to complete construction, even in the event of cost overruns. To secure such commitments, the capital suppliers will have to be convinced that the project is economically feasible and that adequate cost-control provisions have been made to limit cost overruns. To that end, an IROR plan will be supportive of the capital market's demand for cost-control assurance.

Commitments of capital should also be promoted by Commission actions designed to enhance the economic feasibility of the project. At an early stage of the proceedings before the FPC, it was generally agreed that a cost-of-service tariff and rolled-in pricing would be required for this project, in order to provide assurance of revenues to capital suppliers. The Commission is therefore prepared to approve a cost-of-service tariff (with some service interruption qualifications), to go into operation once gas flow commences. (The Decision prohibits any charges to customers prior to gas deliver. 17/) It is also probable that the cost of the gas will be rolled in with the cost of other gas available to the sponsoring companies.

16/ (continued from previous page)

Pipe Line Company v. Mobile Gas Service Corporation, 350 U.S. 332 (1956) (when a public utility or pipeline enters into a fixed rate contract which become unprofitable, the Commission cannot allow a rate increase unless the contract rate becomes so low as to severely impair the ability of the utility to maintain service). Moreover, as in this case "[e]conomic regulation under the commerce power, affecting an industry generally, is not a taking of property if the value of property is thereby reduced or business risks increased." Southern Louisiana Area Rates Cases v. FPC, 428 F.2d 407, 428 (5th Cir.), cert. denied, 400 U.S. 950 (1970).

17/ Decision, p. 37.

2. Effect on Project Debt

Many of the comments pointed out that, in the event of overruns, a reduced equity rate of return would lower the coverage ratios for the project debt. This normally implies higher-cost debt financing or more difficulty in obtaining debt, since lower coverage tends to indicate higher probability of default.

On this project, however, the cost-of-service tariff will yield extremely dependable revenues, so that the probability of default will be very low regardless of equity and earnings coverage. The allowed revenues would always be more than sufficient for debt service, and would be so stable that the conventional interpretation of a thin coverage ratio would not apply. Debt holders should not, therefore, react negatively to the IROR, and should be reassured by its tendency to reduce overruns, since overruns more than anything else threaten the project's viability. Reduced overruns also mean that debt holders will not be required to advance further funds to finance those overruns. In sum, it seems that on balance the IROR concept offers debt holders more benefits than risks.

Even though it seems highly unlikely that the IROR itself will prevent debt financing, some comments raised the possibility that the one-time adjustment to the rate base could hinder debt service. This concern was voiced by the financial advisers to the Alaskan Northwest partnership. 18/ These advisers stated that debt financing would be unavailable if the rate base could be so much reduced that depreciation would be inadequate to cover senior debt principal repayment.

Even under the most extreme IROR mechanism imaginable, the reduction in rate base could not exceed the total equity investment in the project. Therefore, the depreciation component of the remaining rate base would always be adequate to repay the debt principal. Also, the rate of return on that rate base would always be more than adequate to cover interest on the debt.

18/ Bank of America and Citibank, letter to John G. McMillian dated June 2, 1978, attached to Alaskan Northwest reply comments.

A different problem might occur if the rate of debt repayment were much higher than the allowed rate of depreciation of the rate base. But this would constitute a problem of the timing of the cash flows, as opposed to a shortfall in the collection of the total sums required to service debt. Should this problem surface in the project's debt financing plan, the Commission will consider whatever adjustments are necessary to resolve it. 19/ The problem should not arise, however. The sponsors and suppliers of debt should recognize the certainty of operating income which the cost-of-service tariff provides. This certainty should enable them to structure the debt repayments over a large period of the life of the project.

3. Effect on Project Equity

Many of the comments concerning the effect of IROR on equity have already been treated in the section entitled Project Feasibility. The ability of the project to attract equity funds is crucial. This section discusses some other specific issues of interest to equity holders.

a. Risks due to IROR: The principal effect of IROR on equity is to introduce some variability in the allowed return to equity, which implies that the equity investment is somewhat more risky. All funds invested in the equity portion of the project (25% of total) will receive the Incentive Rate of Return determined from the IROR schedule which is ultimately adopted by the Commission. Since the allowed rate of return will vary according to cost control performance, the actual allowed rate of return cannot be determined in advance. Equity investors will have to form expectations about rate of return based on their expectations of the cost of the project.

These added risks due to the IROR are similar to ordinary business risks faced in competitive industries. In such industries, firms with lower costs are rewarded with higher profits, and equity investors must make

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19/ For example, a minimum bill might be utilized in cost-of-service tariff which would ensure debt service, including sinking fund payments.

judgments as to which firms will be most profitable. Imposing the IROR on a regulated industry is merely an attempt to inject ordinary profit-making incentives -- and thus also some ordinary business risks -- into a regulated industry. The risks associated with IROR should therefore not be unfamiliar to most investors.

b. Marginal return on equity: An issue which has generated considerable misunderstanding is the marginal return to equity investment in cost overruns. The effect of the marginal rate has been explained. The essential point is that all equity investment will be awarded the rate of return determined from the IROR schedule, and, as overruns increase, that rate of return for all equity funds will decrease.

In the example IROR schedule contained in this notice, a cost overrun of 40% above the costs filed with the Commission in March 1977, after adjustments for inflation and design changes required by the Government, implies 16.4% return on equity for all equity invested, while a 30% overrun will be awarded a 17% rate of return on all equity invested. This unavoidably implies that those equity funds invested to provide for the overrun from 30% to 40% receive only an 8% return. When this is "rolled in" with the return on the funds receiving 17%, however, the total result is a single pool of equity which covers the 40% overrun and which receives a 16.4% return.20/

The marginal rate is important in determining the strength of the incentive to avoid overruns, but the compensation of equity investors is determined by the Incentive Rate of Return on equity, which can be read directly from the IROR schedule.

c. Double leverage: The comments of Northwest Pipeline Corporation pointed out that the IROR could lead to violation of indenture agreements for companies with existing debt structures. The effect of any such restriction is subject to the control of the parent companies in their determination of the financing plan.

20/ Here again, there may be restrictions on distribution of return among different contributions to the pool under prior agreements among those contributors. See footnote 8 above.

To the extent that part of the investment of project "equity" actually consists of parent corporation debt, varying the allowed return on project equity will affect the debt coverage of the parent. This could conceivably violate the indenture agreements of some of the parent corporations of the partnership. This seems unlikely, however, since the adoption of IROR materially increases the prospects that sponsor parent companies will not violate indenture debt limits, because the IROR reduces construction costs.

C. Cost Estimation and Control

Most of the comments filed included protestations that investors should not be penalized for cost overruns which are beyond the sponsors' control. In this connection, the comments argued that the list of changes in scope for which projected costs should be adjusted included in the May 8 notice was deficient. Because of the importance and complexity of this problem, the Commission has decided to consider the issue in a separate proceeding to be initiated as soon as possible.

An issue closely related to uncontrollable cost increases is that of inflation. Many of the comments dealt with methods of adjusting projected costs for the effects of inflation. These comments are discussed below, in the explanation of the Commission's new proposal on inflation adjustments.

The State of Alaska expressed concern that the IROR mechanism would prompt the project sponsors to reduce the quality of project construction in order to lower costs. The inferior construction would then have to be compensated for through higher operation and maintenance expenses. This strategy would hold down the Cost Performance Ratio but would result in higher costs to consumers.

Although this strategy is a theoretical possibility, we believe that there is relatively little latitude at the current stage of project development to alter the pipeline design or construction methods to shift costs to the operating period. There are always trade-offs in design such as that between additional compression (capital cost) and higher fuel cost (operating cost), but this Commission, the Federal Inspector, and other government agencies will closely monitor the pipeline design and construction to assure that the pipeline is built to the appropriate technical standards.

D. Investment Tax Credit

The Office of Regulatory Analysis argued that the investment tax credit should be considered in determining the marginal rate in the IROR schedule. As the discussions of the marginal rate and the overall IROR schedule in later sections of this notice indicate, the Commission has not and will not consider the investment tax credit in determining the IROR schedule.

E. Neutral Zone in IROR Schedule

Many of the comments proposed a center zone, in which the rate of return would not decline. For example, for cost overruns between 0% and 40%, no penalty would be assessed, and a schedule might look like this:

Cost Performance Ratio	ROR
1.0	17%
1.2	17%
1.4	17%
1.6	16.4%

This proposal has the drawback that no cost-control incentives exist in the range 1.0 to 1.4. If the project were virtually complete at 1.2, then investment in overruns up to 1.4 would earn a marginal rate of 17%.

F. Varying the Marginal Rate

The Office of Regulatory Analysis suggested two reasons for choosing different marginal rates for different ranges of Cost Performance Ratios:

> 1. The difficulty of avoiding overruns may vary along the range of possible cost outcomes. ORA asserts that the strength of the incentive should vary accordingly: where overruns are more difficult to avoid, greater rewards for cost control should be offered.

Although this argument has some theoretical appeal, the Commission cannot see any *a priori* reason to believe that cost overruns will be any easier to control at any stage of project completion. The Commission prefers to preserve the simplicity of a single marginal rate, set at a level that ensures an incentive effect at all possible outcomes.

The Commission believes that much of the effort involved in containing cost overruns will be invested in planning prior to commencement of construction. A constant marginal rate will allow the project sponsors to establish policies for controlling overruns prior to construction which are commensurate with *all* of their financial constraints, including the incentive effect of the marginal rate, and retain those same policies throughout the construction period. Such constancy in and of itself should be helpful in controlling cost overruns.

> 2. This notice proposes to compensate investors for IROR risk by raising the level of the Center Rate of Return as a result of adding the IROR risk premium. ORA suggests that compensation should instead be granted by increasing the possible rewards for cost underruns.

If the rewards for underruns were increased while the penalties for overruns remained the same, the expected returns to investors would have increased. The value to investors of the higher potential rewards depends on the probability they attach to cost underruns. Designing the IROR schedule in this fashion requires the use of very low (even negative) marginal rates for low cost performance ratios.

Gas consumers may prefer this method of compensating for investment risk, since it reduces their risk. The ORA alternative would result in a broader range of values for the Incentive Rate but would tend to reduce the range of values for the cost of service expected to be paid by consumers.

The major reservation about this alternative approach is that the increase in the Incentive Rate for lower values of the Cost Performance Ratio may have to be very large in order to provide the same compensation for risk as would be provided by simply raising the Center Rate. If investors think underruns are unlikely, then they will attach little importance to the potential high rewards. Moreover, equity investors may be more concerned about the "downside potential" than about large possible gains. These two factors in combination could mean that extremely high rewards would have to be offered in order to match the effect of a small increase in the Center Rate.

G. Accounting Treatment of Rate Base Adjustment

In their comments, the Office of Pipeline and Producer Regulation and Tennessee Gas argued that the one-time adjustment introduced complex accounting and tax considerations into cost-of-service calculations.

We propose to consider the one-time adjustment to the rate base as an adjustment to the allowance for equity funds used during construction. Such procedures are already necessary in cost-of-service calculations without an IROR mechanism, since the allowance for equity funds used during construction must be recognized as a cost of the investment. The depreciation of equity AFUDC, however, is not utilized in calculating taxable income. Under current procedures, this is recognized in calculating corporate income taxes as a component of the cost of service.

Thus, the same procedures that are now used to account for the tax implications of the equity AFUDC account would be applicable to treatment of the one-time adjustment to the rate base. No new procedures will be needed.

H. Alternative Methods of Applying IROR

Many comments on the originally proposed rulemaking favored the application of the IROR schedule during the construction period only, in which case the one-time adjustment to the rate base would instead be accomplished through variation of the equity AFUDC rates of return.

This approach was considered by the Commission, since its incentive effect could be made comparable to the mechanism proposed in this notice. In order for the two approaches to be equivalent, however, the range of rates of return in the IROR schedule must be far greater for the AFUDC rate method than for the currently proposed method. This is because, under the AFUDC rate method, the Incentive Rate of Return would be applied only during the construction period, rather than over the life of the project. Consequently, the total present value of any reward or penalty would be far smaller than if the same Incentive Rate were to be applied for the entire project life. These smaller rewards and penalties constitute a lesser incentive.

The degree of incentive effect of a given marginal rate can be properly evaluated only if it is derived from an IROR schedule that is in effect for the entire project life. The same IROR schedule applied to a shorter period yields smaller rewards or penalties and therefore a lesser incentive effect. For this reason, the Commission would consider the AFUDC rate method only if the range of rates in the IROR schedule were adjusted so as to invest the AFUDC method with an incentive effect equivalent to that attained by the life-of-project method used in this notice.

The Commission's adjustment to rate base methodology also allows clearer recognition of the changed degree of risk associated with the project after gas deliveries commence. By using a rate-base adjustment to compensate for all construction phase risks and insisting on an operation phase rate appropriate for the risks encountered at that time, the Commission is trying to assure that those who bear the construction phase risks have the opportunity to earn a significantly higher rate of return than those who do not. The Commission's preferred method is consistent with the policy objective we were seeking in approving the discounting principle which is part of the sponsoring companies' Partnership Agreement.

I. Effect on Consumers

Some parties pointed out that IROR entails some costs to consumers. Investors must be allowed higher rates of return as compensation for the risks added by the IROR. In addition, any benefits from cost control must be shared with investors, in the form of the higher incentive returns paid as rewards for good management.

The Commission must structure the IROR mechanism in such a way that the benefits to consumers from cost control outweigh the costs imposed on consumers by IROR. The example IROR schedule presented in this notice is designed to provide consumers with net benefits under very plausible conditions. (See section IV.A.5.)

J. Alternative Proposal of Alaskan Northwest

In its comments, the Alaskan Northwest partnership proposed an alternative IROR mechanism which in many respects is similar to an alternative the Commission discussed in the notice of May 8. The major features of the Alaskan Northwest alternative are:

(1) Only the rate of return on equity during construction (the AFUDC rate) would be increased or reduced by cost control performance.

(2) The Incentive Rate of Return would have a high rate of 20 percent and a low rate of 12 percent. The Center Rate in the proposed schedule is 17 percent.

(3) In the center of the IROR schedule would be a "neutral" area where the rate of return would not be changed. In the example given by Alaskan Northwest, the neutral area extended from a cost performance ratio of 1.01 to 1.40. In other words, if cost overruns were less than 40 percent over the projected costs, the Incentive Rate would equal the Center Rate of 17 percent.

(4) During construction, projected costs would be revised to reflect all changes in prices of materials and labor, changes in design, route, or schedule ordered by Federal or state authorities, <u>force majeure</u> or acts of God, and all other changes in cost beyond the control of the sponsors. Only changes in quantities of materials and labor would be tabulated in cost overrun.

We have constructed an example of how the Alaskan Northwest IROR mechanism would be applied to various cost overruns within the Alaskan segment of the system. The values used in the alternative mechanism are taken from the comments of Alaskan Northwest, while the construction costs, schedule, and financial assumptions are taken from earlier filings and applications, in particular the March 1977 capital cost estimates.

Table I presents an example of the Alaskan Northwest proposal. For comparison, we also show an example of the cost of service under conventional ratemaking -- i.e., without an IROR mechanism -- for various levels of cost overruns. The costs of service for various levels of the Cost Performance Ratio are calculated by simply increasing all direct capital costs in the March 1977 estimate by the proportion indicated in the Cost Performance Ratio.21/

The cost of service calculations in 1975 dollars follow the methodology used in the President's Decision and Report.22/ In order to measure the cost of service over the life of the project, the present worth average cost of service for a 20-year operation life has been calculated. This average is higher than a simple arithmetic average, but it more accurately reflects the change in cost of service over time.23/

21/ The Cost Performance Ratio could also be increased by extending the construction schedule without changing direct capital costs.

22/ All capital and operating costs have been increased 5 percent per year to reflect inflation. The per-unit cost of service has then been deflated to 1975 dollars.

23/ The present worth average is that constant charge per unit of gas over the 20-year period which has the same present worth as the declining transportation charge that would result from a conventional cost-of-service calculation. A discount rate of 10 percent is assumed in computing the present worth. A different discount rate would change the average, but the relationship between different values would be the same.

TABLE I

CONVENTIONAL RATE MAKING			ALASKAN NORTHWEST PROPOSAL				
17% AFUDC & Operating Rate			Variable AFUDC Rate & 17% Operating Rate				
Cost Performance Ratio	Rate Base ($ Million)	Present Value Average Cost of Service ($/MCF)	AFUDC Rate (%)	Rate Base ($ Million)	Change in Rate Base ($ Million)	Present Value Average Cost of Service ($/MCF)	Equivalent Operating Rate on Equity (%)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
0.8	2,769	0.332	20.0	2,804	35	0.339	17.8
1.0	3,461	0.407	18.0	3,476	15	0.410	17.3
1.2	4,154	0.483	17.0	4,154	0	0.483	17.0
1.3	4,500	0.521	17.0	4,500	0	0.521	17.0
1.4	4,846	0.558	17.0	4,846	0	0.558	17.0
1.6	5,538	0.634	13.0	5,450	- 89	0.615	15.9
1.8	6,230	0.709	12.0	6,107	- 124	0.684	15.7
2.0	6.922	0.785	12.0	6,785	- 138	0.755	15.7
2.2	7,615	0.860	12.0	7,464	- 151	0.829	15.7
2.4	8,307	0.936	12.0	8.142	- 165	0.902	15.7

NOTES FOR TABLE I

Column (2) -- Calculated from the March 1977 cost estimates for the Alaska segment in 1975 prices assuming 75 percent debt capitalization, 10 percent interest rate on debt, 17 percent rate of return on equity, and the proportional change in all direct capital costs indicated by column (1).

Column (3) -- Assumes 5 percent annual inflation in capital and operating costs, with the subsequent annual cost of service deflated to 1975 prices using 5-percent deflation factor. Gas fuel cost is $1.60 per MCF. Rate of interest on debt is 10 percent. Rate of return on equity is 17 percent. Present value average cost of service is calculated from the formula:

$$\sum_{t=1}^{20} C_t(1.1)-t/\sum_{t=1}^{20} (1.1)^{-t}$$

where C_t is annual unit cost of service in 1975 prices.

NOTES FOR TABLE I CONT.

Column (4) -- Taken from p. 16 of the initial comments by Alaskan Northwest Transportation Company.

Column (5) -- Same as column (2), except that the AFUDC equity rate is that given in column (4).

Column (6) -- Column (5) minus column (2).

Column (7) -- Same as column (3).

Column (8) -- Rate of return on equity during construction applied to the rate base in column (2) that generates the same present worth at a 10 percent discount rate of the return of equity and after-tax return to equity as does the 17 percent rate of return applied to the rate base in column (5).

A basic feature of the Alaskan Northwest proposal is that the equity rate of return would vary only during construction. The Commission has calculated the equivalent change in the equity rate during operation. By equivalent, the Commission means the Operation Phase Rate applied to the conventional rate base which would produce the same present worth of cash flow to equity investors as would the 17 percent Operating Rate applied to the rate base derived from the variable AFUDC equity rate.24/ To use an example from Table I, with a Cost Performance Ratio of 2.0 equity investors should be indifferent between receiving an Operation Phase Rate of Return of 17 percent on the rate base of $7.46 billion or receiving a rate of 15.7 percent on a rate base of $7.62 billion. The rate base of $7.62 billion is the conventional rate base derived from an equity AFUDC rate of 17 percent, while the rate base of $7.46 billion is derived from the equity AFUDC rate lowered to 12 percent because of the assumed large cost overruns.

The Commission's fundamental objection to the Alaskan Northwest proposal is that the implicit marginal rate of return is not less than the rates of return that can be earned on alternatives of equal risk, and thus does not provide sufficient incentive for management to reduce costs. This is obviously the case with the so-called "neutral zone." For values of the Cost Performance Ratio between 1.01 and 1.40, there would be no reduction in the AFUDC equity rate. In this zone, the IROR schedule is flat; the marginal rate is equal to the Incentive Rate.25/ On all cost overruns within this zone, therefore, sponsors could expect to earn the after-tax rate of return of 17 percent.

Even outside the neutral zone, the marginal rate of return over the operating period would be very high. In Table I, the equivalent Operating Rates of Return vary from 17.8 percent for a Cost Performance Ratio of 0.8 to 15.7 percent for a Cost Performance Ratio of 2.2. The marginal rate that would produce this drop in the Incentive Rate is 14.5 percent.26/ On the

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24/ The discount rate used is 10 percent.

25/ An IROR schedule that does not reduce the average rate as the Cost Performance Ratio increases exhibits a marginal rate equal to the average rate. The average will decline only if the marginal is less than the average.

26/ Calculated from the ratio

$$[(2.2)(15.7) - (0.8)(17.8)] / (2.2 - 0.8).$$

average, equity investors could expect the rate of return on their investments in cost overruns to be 14.5 percent: a rate of return high by previous standards of this Commission and higher than one could expect in many other equity investments in the U.S. Therefore, this proposed IROR schedule, if applied to the construction phase only, would not offer sufficient incentive to control costs.

A second concern with this proposal involves the relationship among the overall level of allowed rates, the degree of penalty for overruns, and the degree to which projected costs may be revised during the course of construction. The comments of Alaskan Northwest and other project sponsors suggest that they envision a process by which projected costs are continually revised to account for changes to the earlier cost estimates caused by design or routing modifications required by government authorities, force majeure, acts of God, strikes, and changes in prices of labor or materials. While adjustments for some of these events will undoubtedly be required, it is unlikely that the Cost Performance Ratio would ever exceed 1.0 if all of these changes in the projected cost estimates were made. If this Commission were to accept a policy of unlimited adjustments to the sponsors' cost estimates,it would feel compelled to require a lower marginal rate and a lower overall level of rates (a lower Center Rate of Return). The applicant has, however, proposed a very high marginal rate and a Center Rate of 17 percent, which is substantially and unnecessarily higher than the range of rates allowed by this Commission in the past.

IV. THE COMMISSION'S REVISED PROPOSAL

Using the principles outlined in section II, the Commission has revised the terms and conditions first presented in its May 8 proposal of rulemaking. Included in this section is an example of an IROR schedule. The values in that example are representative of numbers the Commission could approve upon appropriate findings in an evidentiary proceeding. The example is reasonable, given the estimates of the underlying rates of return and risk premiums specified in this section. The actual rates of return will of course be set when the various components of the overall risk distribution framework, such as the scope change process, the capital structure, and the workings of the project company tariff, have been specified and when evidence on the rates of return and risk premiums has been considered by the Commission.

A. An Example IROR Schedule

1. Benchmark Rates of Return

a. The Operation Phase Rate: The Operation Phase Rate is the rate of return on equity that will be allowed after the pipeline is in operation and after the one-time adjustment to the rate base has been made. This rate will be set pursuant to the usual process for determining allowable rates for pipelines with similar operating risks.

The degree of the pipeline's operating risk exposure is a point in controversy. Several comments argued that the risk exposure would be substantial. On the other hand, the Office of Regulatory Analysis argues that ANGTS operating risks will be much lower than those of other pipelines, since there will be no risk associated with decline in throughput.

It is true that the cost-of-service tariff eliminates the risk of variations in throughput which are beyond the control of the pipeline by automatically adjusting the transportation tariff accordingly. For certain other service interruptions, however, the cost-of-service tariff will

have provisions for lowering rates of return. Service interruptions pose a risk of unknown dimensions, inasmuch as these pipelines will traverse a hostile environment and will have unknown operating conditions. The details of the project company tariff will determine the degree of risk being borne by the sponsoring companies. The dimensions of the pipeline's risk exposure will be an important issue to be resolved in the evidentiary proceedings which will be held.

For present purposes, a rate of return of 13 percent has been chosen as the Operation Phase Rate in the numerical examples to be presented later. The Commission has set rates of return on equity for two pipelines with cost-of-service tariffs: Pacific Gas Transmission (13.0 percent) and Columbia Gulf Transmission (13.5 percent).27/

The final rate will be determined after more information about risks during the operation phase has been specified in the project company tariff and may vary between segments of the ANGTS. Over time, this rate will then be adjusted up or down as general financial conditions change.

b. The Non-Incentive Rate: The Non-Incentive Rate of Return on equity is the rate that would be allowed if the IROR mechanism were not employed. This rate should provide equity investors with a risk premium for the construction phase risks associated with the Alaskan gas project, but should not provide any compensation for the particular risks created by an IROR mechanism.

27/ Pacific Gas Transmission Company, Docket No. RP75-57, Opinion No. 811, Order Modifying Initial Decision, July 8, 1977.

Columbia Gulf Transmission, Settlement Agreement, Docket Nos. RP76-94, 76-95, 76-138, and 75-106 (AP76-1), March 16, 1978.

Fifteen percent has been chosen as an example rate of return on the Alaska segment, for the following reasons:

- o 15% is at the lower end of the range discussed by the applicants in the administrative hearings on this case.28/
- o 15% was found reasonable by the Administrative Law Judge who heard the case before the FPC.29/
- o 15% was used in cost-of-service calculations in the FPC's report to the President and in the President's Decision.30/

The difference between the 13 percent Operation Phase Rate and the 15 percent Non-Incentive Rate is intended to compensate for the construction phase risks associated with the Alaskan gas project.

The rate for the Northern Border segment may be somewhat less than the rate for the Alaska segment, since it will be built in a more familiar environment and does not involve as much uncertainty as the Alaskan segment. Because it is part of a large, complex system and because its success is dependent on successful completion of other segments, however, it may still present more risk than conventional lower 48 pipelines.

28/ Initial Decision on Proposed Alaska Natural Gas Transportation Systems: El Paso Alaska Company, Docket No. CP75-96, et al., Federal Power Commission, February 1, 1977, pp. 369-370.

29/ Recommendation to the President: Alaska Natural Gas Transportation Systems, Federal Power Commission, May 1, 1977, pp. IV-12 to IV-14.

30/ Decision, pp. 125 and 163.

c. The Center Rate: The Center Rate of Return on equity is the rate specified by the IROR schedule when actual construction costs equal the expected level of cost overruns: i.e., the rate which is the Center Point of the schedule. Because of the uncertainty about the ultimate rate of return created by the IROR mechanism, this Center Rate must have a premium over the rate that would be allowed if no IROR mechanism were used.

Seventeen percent is used in this example as the Center Rate for the Alaska segment. The two-percentage point difference between the Non-Incentive Rate and the Center Rate represents compensation for the risks created by the IROR mechanism.

Since there is less uncertainty about construction costs for the more conventional pipeline construction on the Northern Border system, the compensation for the risks of the IROR mechanism may be less on that segment. This implies a smaller difference between the Center Rate and the Non-Incentive Rate. Again, more definitive information on the complete structure of allocation of project risks must be available before the Commission can make a final determination of this rate.

2. The Marginal Rate

In determining a marginal rate of return that will embody a significant incentive to control costs, the Commission must compare the marginal rate to the cost of the capital that sponsors invest in the equity portion of the project. A marginal return below the cost of that capital will discourage sponsors from investing in overruns.

The sponsors' cost of capital will be determined by their own costs of equity and debt, as well as by the composition of the capital they invest in the equity portion of the project. If sponsors were to invest only equity, then an effective marginal rate would only need to be lower than the cost of equity. If the sponsors raise their capital for the equity portion of the project through some combination of debt and equity, however, then the marginal rate must be set below the weighted average cost of that capital. If the sponsors were to finance this investment completely through the sale of debt, then the marginal rate would have to be less than the after-tax cost of debt.

The potential investors for the equity portion of the project are diversified corporations that invest in other U.S. industries. This suggests that their costs of equity are near some average of the returns on equity available in all U.S. industries. This number is, of course, not directly observable in the marketplace, since part of the return is appreciation in stock market prices. Studies of historic earned rates of return show that the long-run rate of return on common stock (dividends plus capital gain) ranges from 9 to 11 percent.31/ Adjusted for the 85 percent exclusion rule for intercorporate dividends, this would suggest a return of 8 to 10 percent. In light of current expectations that future inflation will be higher than the average over past decades, these rates of return could be increased by perhaps three percentage points, to 11 to 13 percent.

31/ Lawrence Fisher and James H. Lorrie, "Rates of Return on Investment in Common Stock," Journal of Business, January 1964. "Rates of Return on Investment in Common Stock: Year-by-Year, 1926-65," Journal of Business, July 1968. Irwin Fried and Marshall E. Blume, "Demand for Risky Assets," American Economic Review, December 1975. Roger G. Ibbotsen and Rex A. Sinquefield, "Stocks, Bonds, Bills, and Inflation: Year-by-Year Historical Returns (1926-1974)," Journal of Business, January 1976.

The current market rate on long-term debt is near 10 percent, implying an after-tax cost of debt of roughly 5 percent. Assuming that investments in the project equity are financed at a typical debt ratio of .60, these rough estimates of capital costs can be used in calculating an example of an effective marginal rate. The weighted average cost of capital implied by the assumptions is:

$$(.4)(13) + (.6)(5) = 8.2$$

Based on this calculation, an 8 percent marginal rate is embodied in the example IROR schedule.

3. The Center Point

The Center Point of the IROR Schedule is that Cost Performance Ratio associated with the Center Rate of Return. The Center Point should represent the expected level of costs after adjustments for inflation and design changes. If the final cost estimates do not differ significantly from the March 1977 estimates, a Center Point for the Alaska segment might be 1.3, as used in the example. The Center Point on the Northern Border segment may be lower.32/ If the project sponsors prefer significant freedom to revise cost estimates for reasons other than inflation, it seems likely that the recommended Center Points should be lower.

32/ Page 155 of the Report accompanying the President's Decision states that overruns are expected to increase direct capital costs for the Alaskan segment from the March 1977 estimate of $1.812 billion to $2.38 billion, excluding AFUDC and in constant 1975 dollars. This would be an increase of 31 percent. On page 157, a comparison of current dollar costs including AFUDC shows an expected overrun of 24 percent for the Alaskan segment ($4.147 versus $3.335 billion) and 10 percent for the Northern Border segment ($1.573 versus $1.427).

4. The Example Schedule

Having estimated values for the Center Rate, the Marginal Rate, and the Center Point, an entire IROR schedule can be determined. The example resulting from a Center Rate of 17 percent, a Marginal Rate of 8 percent, and a Center Point of 1.3 is shown below. 33/

8% Marginal Rate
17% Center Rate
1.3 Center Point

Performance Ratio	ROR (%)
.8	22.6
1.0	19.7
1.2	17.8
1.3	17.0
1.4	16.4
1.6	15.3
1.8	14.5
2.0	13.9
2.2	13.3
2.4	12.9

Pursuant to this schedule, a rate of return of 19.7 percent would be allowed for the Alaskan segment if actual costs after correction for inflation and changes in scope were no higher than the March 1977 estimates (a cost performance ratio of 1.0). For a 30 percent overrun (a cost performance of 1.3), a rate of 17 percent would be allowed. At a 67 percent overrun from the corrected March 1977 estimates, the rate would be reduced to 15 percent (the Non-Incentive Rate). In other words, only a constant dollar cost increase equal to two-thirds of the original estimate would lower the rate of return in this example below the rate that would be allowed if no IROR mechanism had been adopted. At a 134 percent over-

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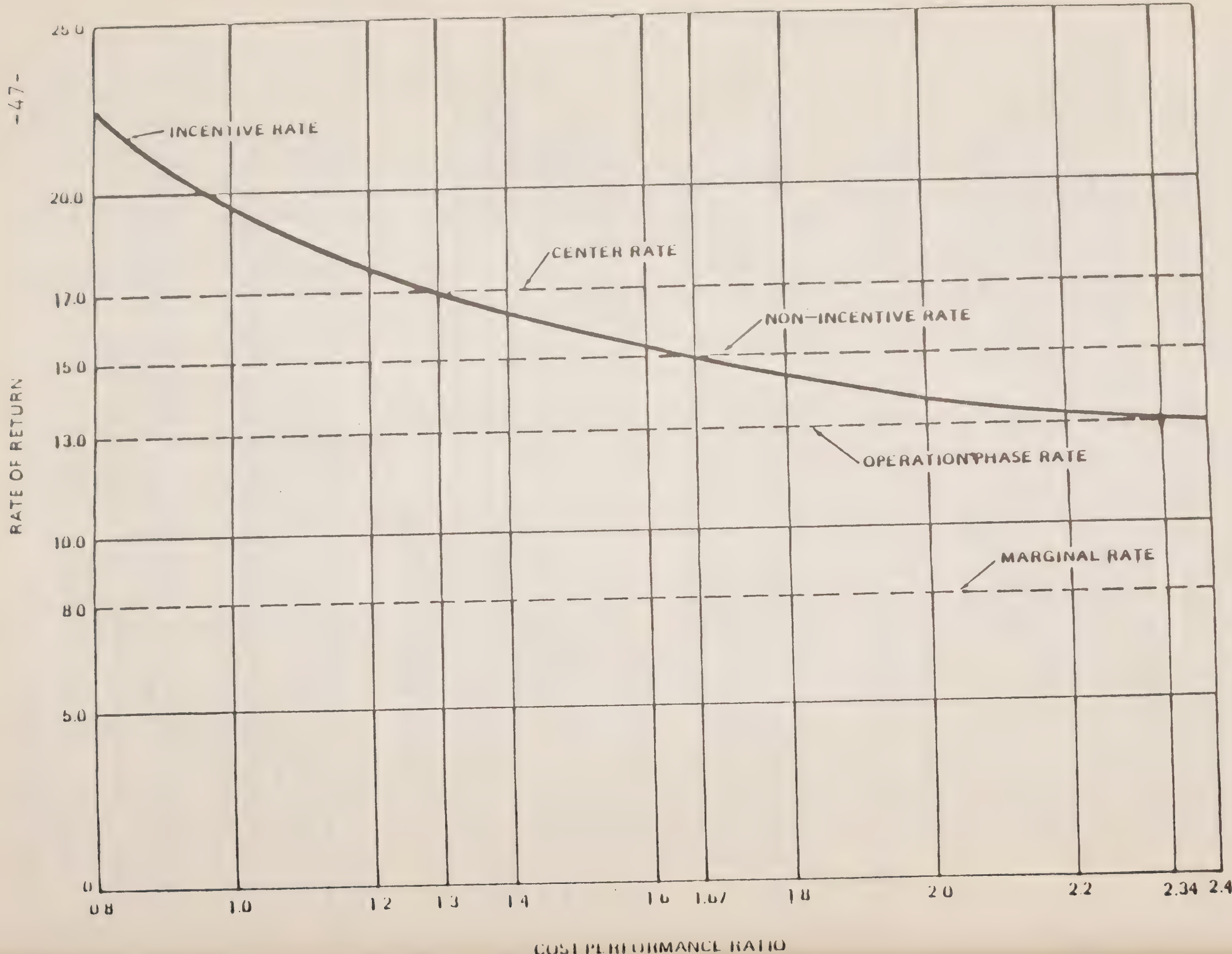
33/ A value of the Incentive Rate (R) can be determined for any value of the Cost Performance Ratio (A) from the formula $R = [(17)(1.3) + 8(A - 1.3)]/A$

$$= 8 + (11.7)/A$$

AN EXAMPLE OF A REASONABLE IROR SCHEDULE



in--i.e., a cost performance ratio of 2.34--the rate of return would be reduced to 13 percent (the Operation Phase Rate). In other words, only for more than a doubling of construction costs would the rate of return in this example be reduced below what is being allowed for other pipelines. 34/

This example of the Commission's revised proposal is displayed in Table II, which shows the Incentive Rate for various levels of the Cost Performance Ratio, the size of the one-time adjustment to the rate base, and the Adjusted Rate Base. It also gives the present value average cost of service.

5. Benefit to Consumers

As discussed earlier, the IROR mechanism may result in higher rates of return allowed on equity, which will increase costs to consumers. However, the IROR mechanism will create an incentive for management to reduce construction costs, thus benefiting consumers. On balance, the Commission believes that the benefit of lower construction costs will outweigh the possibly higher rate of return to equity attributable to the IROR mechanism.

In the situation where cost overruns exceed 60 percent of the originally estimated costs, column (4) of Table II 35/ shows that the IROR will be less than would probably be allowed by more typical ratemaking procedures. Consumers thus would clearly benefit from the IROR in this situation. 36/

34/ The average equity rate allowed by this Commission for some 31 natural gas pipeline rate cases in 1976 and 1977 was 12.94%.

35/ The break-even cost reduction is calculated by determining the percentage difference in the cost of service with and without the IROR mechanism, for the same Cost Performance Ratio. This is not strictly accurate, since the operating cost component of cost of service does not increase with cost overruns, but is illustrative of the degree of savings in capital costs which are required for the IROR to produce a cost-effective result.

36/ For Cost Performance Ratios greater than 1.6, the IROR mechanism would actually have to cause an increase in construction costs of a certain minimum percentage, before consumers would be worse off with the IROR mechanism in effect. Thus, for example, column (9) of Table II indicates that, for a Cost Performance Ratio of 2.2, the IROR mechanism would have to increase costs by more than 5 percent (i.e., a reduction of minus 5.0) before consumers would not benefit from the IROR proposal.

If cost overruns are less than 60 percent, the Incentive Rate of Return will be higher than would conventionally be allowed. However, the incentive effect of the IROR should result in lower construction costs than would be the case without the IROR. If cost reductions are reasonable, consumers will realize a net benefit.

Column (9) of Table II shows for each Cost Performance Ratio the minimum reduction in construction costs necessary for consumers to realize a net benefit. For a Cost Performance Ratio of 1.3 (the level expected in the President's Decision), a reduction in construction costs of only 6 percent below what those costs would have been without the IROR will offset the higher rate of return. For a lower Cost Performance Ratio of 1.0, the necessary reduction in construction costs is about 14 percent below what those costs would have been without the IROR. The IROR is expected to reduce construction costs by at least these amounts; consequently, consumers should, on balance, benefit from the IROR mechanism.

B. Inflation Adjustment

The initial proposal recognized that the sponsors should not be held responsible for increases in costs that resulted from general inflation in the economy. The initial rulemaking proposed to divide the final cost estimates into a number of categories for which cost or price indexes were available. These indexes would then be used to inflate the projected costs and thus increase the Projected Rate Base to account for inflation.

This approach has a major weakness. If the pipeline experienced major construction delays resulting in costs incurred after the period anticipated in the applicant's Final Cost and Schedule Estimates, this approach would provide no protection against inflation during the schedule extension, since no projected costs were anticipated for this period. Suppose for example that the applicant had projected a five-year construction period, but because of delays during construction substantial expenditures projected for the fifth year were actually incurred in the sixth year. Suppose, too, that because of high rates of inflation these expenditures are much higher than had they been incurred during the fifth year. Since the projected costs show no expenditures during the sixth year, there is no adjustment for inflation during the sixth year.

TABLE II

CONVENTIONAL RATE MAKING — 15% AFUDC & Operating Rate			FERC PROPOSAL — 15% AFUDC Rate, 13.0% Operating Phase Rate, Adjusted Rate Base					
Cost Performance Ratio	Rate Base ($ Million)	Present Value Average Cost of Service ($/MCF)	Incentive Rate (%)	Adjustment to Rate Base ($ Million)	Adjusted Rate Base ($ Million)	Present Value Average Cost of Service ($/MCF)	Equivalent AFUDC Rate (%)	Consumer Break even Cost Reduction (%)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
0.8	2,747	0.310	22.6	469	3,216	0.377	47.5	21.6
1.0	3,433	0.380	19.7	408	3,841	0.432	39.2	13.7
1.2	4,120	0.450	17.8	346	4,466	0.487	33.0	8.2
1.3	4,463	0.485	17.0	316	4,779	0.514	30.5	6.0
1.4	4,807	0.520	16.4	285	5,092	0.542	28.2	4.2
1.6	5,493	0.590	15.3	224	5,717	0.596	24.3	1.0
1.8	6,180	0.660	14.5	162	6,342	0.651	21.2	- 1.4
2.0	6,867	0.731	13.9	101	6,968	0.706	18.5	- 3.4
2.2	7,553	0.801	13.3	41	7,594	0.761	16.3	- 5.0
2.4	8,240	0.871	12.9	- 22	8,218	0.816	14.3	- 6.3

NOTES FOR TABLE II

Column (2) -- Same as column (2) in table I except that the AFUDC equity rate is 15 percent.

Column (3) -- Same as column (3) in table I except that the equity rate of return during operation is 15 percent and the rate base is given in column (2).

Column (4) -- Calculated from the formula:

$$\frac{(17.0)\ (1.3)\ +\ 8.0\ [\text{Col. 1} - 1.3]}{\text{Col. 1}}$$

For example, at a cost performance ratio of 2.2:

$$\frac{(17.0)(1.3)\ +\ 8.0\ [2.2 - 1.3]}{2.2}$$

$$= 13.3$$

where the marginal rate of return is 8 percent and the Center Rate is 17 percent, at a Cost Performance Ratio of 1.3.

NOTES FOR TABLE II CONT.

Column (5) -- Present value (at 13.0 percent discount rate) of the return of equity and after-tax return to equity at the operating equity rate of return given in Column (4) minus the equity investment in the rate base given in Column (2).

Column (6) -- Column (5) plus column (2).

Column (7) -- Same as column (3) in table I except that the rate of return on equity during operation is 13.0 percent and the rate base is given in column (6).

Column (8) -- The AFUDC equity rate that would produce the rate base in column (6).

Column (9) -- Calculated from the formula:

$$\frac{\text{column (7)} - \text{column (3)}}{\text{column (3)}}$$

The revised approach is to divide the actual construction costs into cost categories for which price or cost indexes are available. These indexes will be used to deflate actual costs to base-year costs. The adjustment for inflation will thereby also apply to costs that occur beyond the projected period of construction. This rate base adjusted for inflation will be termed the Deflated Actual Rate Base in 1978 dollars (or whatever year is the base year for making cost estimates). The Deflated Actual Rate Base in 1978 dollars will be divided by the Projected Rate Base (in 1978 dollars) to determine the Cost Performance Ratio and thus the Incentive Rate of Return.

A number of comments on the initial proposal emphasized the need to choose price indexes that reflect the inflation experienced in pipeline construction in the specific geographic areas where the pipelines will be built. The Commission fully recognizes the problem mentioned in many comments that no price index perfectly measures the inflation experienced by any individual or any project. For example, the widely used consumer price index is only an approximation of the inflation experienced by any particular consumer. 37/ The same problem will exist for each cost category in the Alaskan gas project. However, the Commission believes that existing, widely accepted indexes do not bias the measure of inflation in any particular direction. Certainly for some categories of costs the price indexes may overestimate the actual rate of inflation.

The Alaskan Northwest partnership requests that the inflation rate for Alaska be used instead of the national inflation rate, because the costs in Alaska are higher.

37/ The problem results because a price index measures the inflation for a specified bundle or market basket of commodities. If price increases differ greatly between the commodities, an individual who buys a slightly different combination of commodities could experience a very different actual rate of inflation than the index indicates.

Construction <u>costs</u> are assuredly higher in Alaska. (The construction of the oil pipeline in Alaska provides considerable information on the premiums that must be paid for Alaskan labor or materials and supplies used in Alaska. The cost estimates submitted by the sponsors recognized these premiums.) But it does not necessarily follow that the <u>rate</u> of change in costs (the inflation rate) in Alaska will be either higher than or lower than the rest of the nation. Considering the advantages of using the national rate, and in the absence of clear evidence that the regional rate will differ significantly from the national rate, the Commission would plan to use the national rate of inflation.

The Alaskan Northwest partnership also suggests that the cost of each unit of labor or materials is also beyond its control. It argues that only the <u>quantities</u> of labor and materials should be considered controllable. The Commission agrees that changes in prices or unit costs caused by general inflation are beyond the sponsors' control and will accordingly adjust such costs for inflation by use of cost or price indexes. However, the size of the enterprise relative to the Alaskan economy and the natural gas pipeline industry would indicate that the sponsors should have a major ability to influence wages and prices and should be given an incentive to do so. The labor costs, for example, will probably be the result of negotiations between the sponsors or their contractors and labor unions. As the quantity of labor required will be very large, we believe the project sponsors will have some ability to influence the price they pay.

It is not the Commission's intention to penalize the project sponsors for the effects of inflation; rather, it is the Commission's intention to hold them harmless for cost increases due to general inflation. The Commission's concern with the sponsors' approach is their implicit assumption that they are powerless to affect the prices they pay.

C. <u>Application to the Western Leg</u>

Pacific Gas Transmission (PGT) and Pacific Interstate Transmission state that difficulties would be encountered in determining the size of the one-time adjustment to the rate base for the Western Leg segment of the ANGTS. They argue

that problems are created because the Western Leg will be an expansion of an existing system and will be owned and operated by a corporation with an existing financial structure.

A slightly different procedure would be needed for the Western Leg than is used for the project-financed Northern Border and Alaska segments. The attached terms and conditions state that the return of equity and after-tax return on equity over the life of the system will be estimated based on a financing and capitalization plan approved by the Commission. For the Western Leg, it might be possible for the Commission to use a financing and capitalization plan that is representative of the overall financial structure of the company owning the Western Leg.

The comments also argued that further complications would be created by the possibility of the early construction of a portion of the Western Leg and Northern Border segments to carry Canadian gas as part of an "advance delivery" of Alaska gas. The only complication we see resulting from applying the IROR mechanism to the facilities needed to transport Canadian gas is that the depreciation rate for the pipeline may be relatively high, reflecting the shorter period of the contract for Canadian gas. This simply means that the projection of the return of equity and the after-tax return to equity used to calculate the one-time adjustment to the rate base would be based on a relatively high rate of depreciation reflecting the relatively short period for which gas reserves would be dedicated to the pipeline at the time of authorization of these facilities.

The consideration which persuades us not to apply the IROR to the Western Leg is cost to consumers. The looping of an existing pipeline along an existing right-of-way to transport an assured supply of gas is an undertaking of conventional risk, particularly considering the assurance of adequate revenues provided by a cost-of-service tariff. Because of this conventional risk, the financing plan presented to the President and included in the Decision 38/

38/ Decision, pp. 109-110.

called for 100 percent recourse debt financing for this segment. As distinct from project financing wherein the project itself must provide assurance of debt service, the debt to be used for the Western Leg is to be issued by the sponsoring companies, Pacific Gas Transmission for the Washington and Oregon segments and Pacific Gas and Electric for the Northern California segment, and guaranteed by the parents. This type of financing is much lower in cost than the mixture of debt and equity which will be used to finance the other segments of the project.

Use of the IROR mechanism on the Western Leg would undoubtedly increase financing costs. Debt costs would likely increase because of the additional risk, but more importantly the debt/equity ratio would likely decrease. The use of 100 percent debt financing will increase the proportion of debt in the total capitalization of the sponsoring companies to high levels. This is particularly true for Pacific Gas Transmission. The additional risk created by the IROR may make such high levels of debt capitalization impractical and thus require some equity financing for the Western Leg. Particularly in view of the tax consequences of additional equity financing, the Commission believes the additional financing costs associated with imposition of the IROR mechanism on the Western Leg would more than offset the benefits of reduced construction costs which might be expected to be achieved.

The Commission also believes that cost control incentives are already present in the use of 100 percent debt financing. An incentive effect occurs because the absence of equity capital eliminates the return on equity benefits of cost overruns. Also, the impact of that debt on the parent companies' financial conditions -- debt guarantee capacity and overall credit rating -- will cause them to insist on stringent construction cost-control measures for the Western Leg. Although not as focused as the IROR mechanism, the Commission believes this incentive will be adequate to insure proper control of construction costs for the Western Leg.

Having found that the present Western Leg financing plan already includes a sufficient incentive mechanism, we also note that imposition of IROR to the Western Leg would be administratively infeasible, not in the sense of ease of application, supra, but in terms of impact on the consumer. The 100% recourse debt financing of the Western Leg should result in a lower cost of service (due to higher bond rating and lower cost of recourse debt and favorable tax consequence of debt financing) without IROR than with it.

In the Commission's considered judgment, the application of IROR to the Western Leg lacks the salutary regulatory effect which it will have on the other segments of the project. There is already adequate incentive to control construction costs, and the two bases underlying the President's variable rate of return condition have already been satisfied: the consumer is better off under the existing Western Leg financing plan, and the recourse nature of the debt acts to assure private financing.

V. RELATION OF THIS RULEMAKING TO THE CHANGE-OF-SCOPE PROCEEDING

Throughout this notice, reference has been made to the relationship of the values of an IROR schedule to the outcome of the separate change-of-scope proceeding. That interdependence should be emphasized, for even though the change-of-scope question has been spun off to a separate proceeding, the resolution of the question will be a major determinant in the selection of the final values used in the IROR schedule.

The greater the flexibility that is allowed in adjusting for scope changes, the less is the risk of cost overruns borne by the project sponsors. The actual values in the IROR schedule are partly determined by the risk of cost overruns, and anything that changes the amount of that risk will change the proper compensation for risk to be allowed in the IROR schedule.

Greater flexibility in adjusting costs also reduces the incentives to control costs. The final treatment of scope changes will also affect the Commission's choice of a marginal rate.

The illustrative values in the IROR schedule were based on the March 1977 cost estimates. Revisions in these cost estimates, other than for inflation and scope changes required by the Government, also will affect the final selection of values in the IROR schedule.

The proper values for the different types of rates and ratios (of which estimates have been provided in this notice) must be determined through an evidentiary proceeding to be conducted when all elements of the risk allocation framework have been put in place. We expect that the project sponsors are eager to have this process completed. It is our intention that these matters be resolved as expeditiously as possible.

VI. WRITTEN COMMENT PROCEDURES

The Commission invites interested persons to submit written comments with data, views, and other information concerning the matters set forth in this notice. An original and 14 copies should be filed with the Secretary of the Commission by October 6, 1978. Comments should be submitted to the Federal Energy Regulatory Commission, 825 North Capital Street, N.E., Washington, D.C. 20426, and should reference Docket No. RM78-12.

All written submissions will be placed in the Commission's public files and will be available for public inspection in the Commission's Office of Public Information, 825 North Capitol Street, N.E., Washington, D.C. 20426, during regular business hours.

In consideration of the foregoing, the Commission proposes that the following terms and conditions be attached to the certificates of public convenience and necessity to be issued by the Commission for the Alaska Natural Gas Transportation System, as set forth below.

By the Commission.

Kenneth F. Plumb
Secretary

TERMS AND CONDITIONS

(1) Applicability

The Incentive Rate of Return (IROR) Rule will apply to two of the three segments of the Alaskan Natural Gas Transportation System within the United States as defined in the President's Decision and Report to Congress on the Alaska Natural Gas Transportation System (referred to hereafter as the Decision). These segments are: (1) the portion of the system within the State of Alaska, and (2) the portion of the system from the United States/Canadian border near Monchy in the Province of Saskatchewan to a point near Dwight in the State of Illinois. In the following terms and conditions, the term pipeline refers to each of these two segments, and the terms and conditions apply to each. The values for schedules, parameters, or variables to be established by the Commission in order to implement the IROR rule pursuant to some future evidentiary proceeding may be different for each of the segments.

(2) Cost Performance Ratio

Pursuant to the second finance term and condition of the Decision (p. 36), the rate of return on equity during the operating period of the pipeline will be increased if the pipeline is completed under budgeted cost and reduced if the pipeline is completed over budgeted cost. The relationship between budgeted cost and completed cost will be determined by a Cost Performance Ratio. This is the ratio of the Deflated Actual Rate Base (see condition 4 below) to the Projected Rate Base (see condition 5 below).

(3) Incentive Rate of Return Schedule

The Commission will establish an IROR schedule which may be in the form of a table or formula. The IROR schedule will specify a value for the IROR for each value of the Cost Performance Ratio. The IROR schedule will compensate equity investors for the degree of construction cost overrun and schedule delay risk which they bear. The IROR schedule will take into account financing plans, depreciation schedules, and any other factors which the Commission determines to be relevant and important.

(4) Deflated Actual Rate Base

The Deflated Actual Rate Base will be determined at the start of operations from direct capital or construction costs after conversion into base year prices (see condition 8 below) actually incurred in the construction of the pipeline. The Deflated Actual Rate BAse will include only those direct capital costs which the Commissicn finds to be prudently incurred. An allowance for funds used during construction (AFUDC) will be included. The AFUDC will be based on the direct capital costs in the base year prices, the actual interest rates paid on debt during construction, and the Non-Incentive Rate of Return on equity defined below in condition 10.

(5) Projected Rate Base

The Projected Rate Base will be calculated at the start of operations from the Final Cost and Schedule Estimate submitted to and approved by the Commission pursuant to condition 6 below after adjustment for changes in scope pursuant to condition 9 below. An AFUDC will be included and will be calculated from the Final Cost and Schedule Estimate, the actual interest rates experienced during construction, and amounts of debt and equity that would have been outstanding if the expenditures for construction as projected in the Final Cost and Schedule Estimate had actually occurred, and the Non-Incentive Rate of Return on equity defined below in condition 10.

(6) Final Cost and Schedule Estimate

Pursuant to the second finance condition in the Decision, the applicant for a certificate of public convenience and necessity for the pipeline shall submit to the Commission a Final Cost and Schedule Estimate in 1975 prices, adjusted to reflect any design changes resulting from the Agreement on Principles with Canada and any addendum thereto, for comparison with the capital cost estimates filed by Alcan with the Federal Power Commission on March 8, 1977. This Final Cost and Schedule Estimate must also be submitted in 1978 or later base-year prices and with costs set forth according to formats to be specified

by the Commission. (See condition 7.) The March 1977 cost estimate referred to in the second finance term and condition in the Decision must also be resubmitted in the same format for comparability with the final cost estimate. An explanation of any significant differences between the March 1977 and the Final Cost and Schedule Estimate must be provided. The date of the base-year period for submitting costs may be determined by the applicant.

(7) Cost Estimate Format

All cost estimates shall be submitted to the Commission according to specifications to be determined by the Commission. Prior to submittal of the Final Cost and Schedule Estimate, the applicant may submit a proposal for the Cost Estimate Format to the Commission. The Cost Estimate Format will specify the functional categories or components into which the total cost estimate must be divided and the key parameters or assumptions for which values must be provided. Each functional category of cost must be further divided according to the time period in which the costs are estimated to occur. The breakdown of costs shall be in sufficient detail that the Commission may compare the various cost estimates and determine the reasonableness of any changes.

(8) Adjustment of Actual Construction Costsfor Inflation

Actual costs of construction found to be prudently incurred by the Commission will be divided into a number of cost categories and further divided into periods of time when the costs were incurred. For each cost category, the Commission will specify a price or cost index that will be used to measure the inflation experienced for commodities or services in that category. The actual costs of construction in each cost category and in each time period will be divided by the ratio of the value of the price index for that category and for that period of time by the value of the index in the base year. Each cost or price index will be an existing index that is widely used to measure the increase in prices for that category of commodities or services. The Commission will give first preference to indexes published by the U.S. Government, but indexes published by private institutions may also be used if widely used and generally accepted. The applicant may submit to the Commission proposed price or cost indexes with its proposed Cost Estimate Format mentioned in condition 7.

(9) Changes in Scope

Prior to calculating the Projected Rate Base for determining the Cost Performance Ratio, the Final Cost and Schedule Estimate will be adjusted to reflect increases and decreases in cost that result from certain events not anticipated in preparing the Final Cost and Schedule Estimate, or to reflect agreed changes in values of parameters from those assumed in making the final estimate. The type and number of such events or changes in parameters and the procedure for adjusting the Final Cost and Schedule Estimate will be determined by the Commission pursuant to a future rulemaking, hearing or order.

(10) Non-Incentive Rate of Return

Prior to final certification of the pipeline, the Commission shall specify a Non-Incentive Rate of Return on equity that compensates equity investors for any abnormal risks they will bear during the construction of the pipeline, excluding the risk created by the IROR rule. To the extent that equity investors in this pipeline bear greater construction phase risks than investors in other regulated gas pipelines, this Rate will be higher than the general range of rates allowed for other pipelines. Once established, this Rate will not be altered during the construction phase of the pipeline.

(11) Operation Phase Rate of Return

Prior to final certification of the pipeline, the Commission shall specify an Operation Phase Rate of Return that is within the general range of rates of return for other pipelines with similar operating risks. This rate of return will be determined separately and independently from the IROR. Pursuant to the Natural Gas Act, throughout the operation of the pipeline, the Operation Phase Rate of Return may be altered to reflect changes in rates allowed for other pipelines of similar operating risk or to provide just and reasonable compensation to equity investors.

(12) Cost of Service Calculation

After the initiation of service and during the operating life of the pipeline, the transportation charge will be based on standard procedures for determining cost of service except

that the rate of return on equity will be the Operation Phase Rate defined above in condition 11 and the rate base will include a one-time adjustment calculated pursuant to condition 13 below.

(13) <u>Adjustment to Rate Base</u>

Upon completion of construction and commissioning of the pipeline, a conventional rate base will be calculated based on generally accepted procedures and using the Non-Incentive Rate of Return defined above in condition 10 as the equity rate of return for determining the allowance for equity funds used during construction. A one-time adjustment to the equity AFUDC account in the rate base will then be calculated in three steps. First, the revenue stream from the after-tax return of equity through depreciation of the rate base and from the after-tax return on equity will be estimated over the life of the pipeline, based on the conventional rate base, on an after-tax rate of return on equity capital equal to the IROR determined pursuant to condition 3 above, and on a financing and capitalization plan approved by the Commission. Second, the present worth of this revenue stream will be calculated using a discount rate equal to the Operation Phase Rate determined pursuant to condition 11 above. Third, the difference between this present worth sum and the equity investment in the pipeline, including the allowance for equity funds used during construction based on the Non-Incentive Rate of Return on equity, will be added to the allowance in the rate base for equity funds used during the construction. If the difference is negative, the allowance for equity funds during construction in the rate base will be reduced.